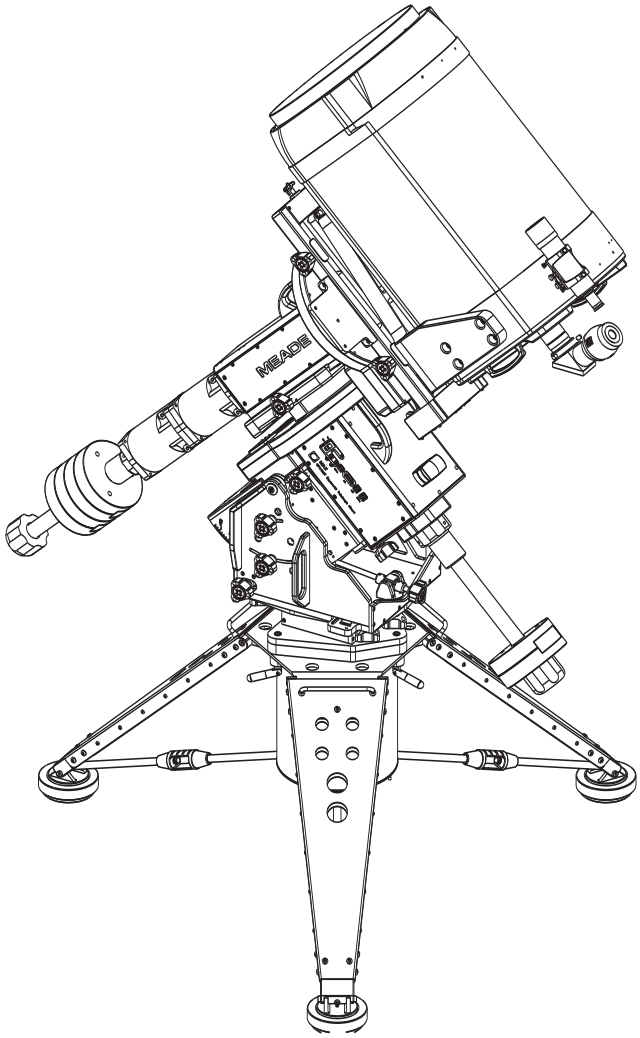
Instruction Manual

16", 20" RCX400™ Advanced Ritchey-Chrétien Telescopes with The Max Mount



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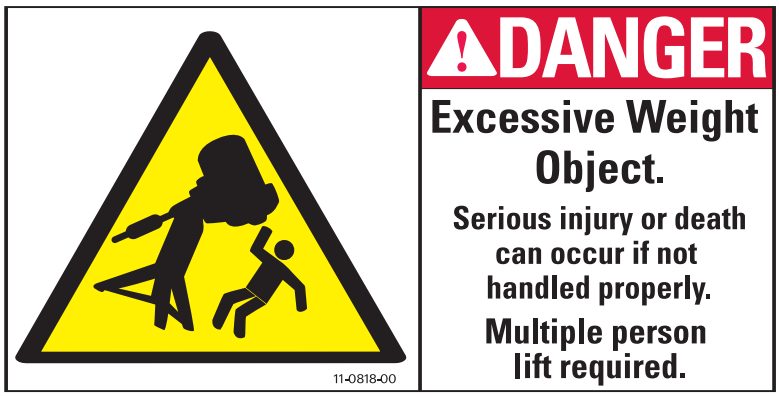
DANGER

Read this manual carefully before attempting to assemble the MAX mount and attaching the OTA. Follow steps as outlined in this manual in order to assemble the telescope safely.

Failure to follow steps may result in injury or death, and/or damage to the telescope and mount.



WARNING!

Never use a Meade® RCX400™ Telescope to look at the Sun! Looking at or near the Sun will cause instant and irreversible damage to your eye. Eye damage is often painless, so there is no warning to the observer that damage has occurred until it is too late. Do not point the telescope or its viewfinder at or near the Sun. Do not look through the telescope or its viewfinder as it is moving. Children should always have adult supervision while observing.

If you have never focused an RCX telescope before, go to pages 24 to 26 for detailed information.

® The names "Autostar," "Meade" and the Meade logo are trademarks registered with the U.S. Patent and Trademark Office and in principal countries throughout the world. "RCX400 " is a trademark of Meade Instruments Corporation.

Patents:

US 6,304,376
US 6,392,799
US 6,563,636
D 422,610
Patent Pending.

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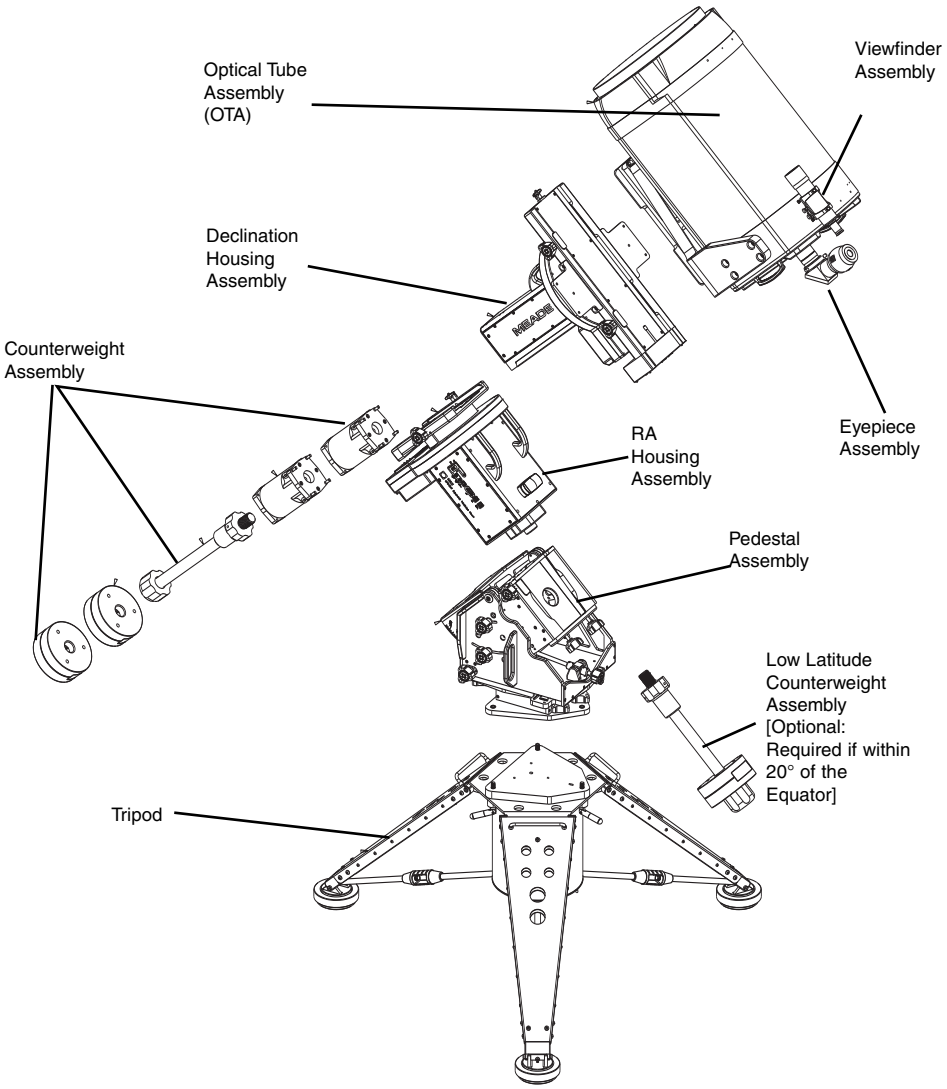
TELESCOPE FEATURES

Components of MAX
MAX features a unique modular design that allows a couple of individuals to assemble, either permanently or transportably, a mount twice the size of any other commercially available mount. The mount breaks down into a Portable Pier (tripod), Pedestal, RA Housing Assembly, and DEC Housing assembly. Together all of the components and an OTA assembly fit easily into a station wagon, SUV, minivan or small truck. When assembled, quick release, but rock solid, dovetail plates allow OTA and instrument packages up to 250 lbs to be quickly mounted and de-mounted.

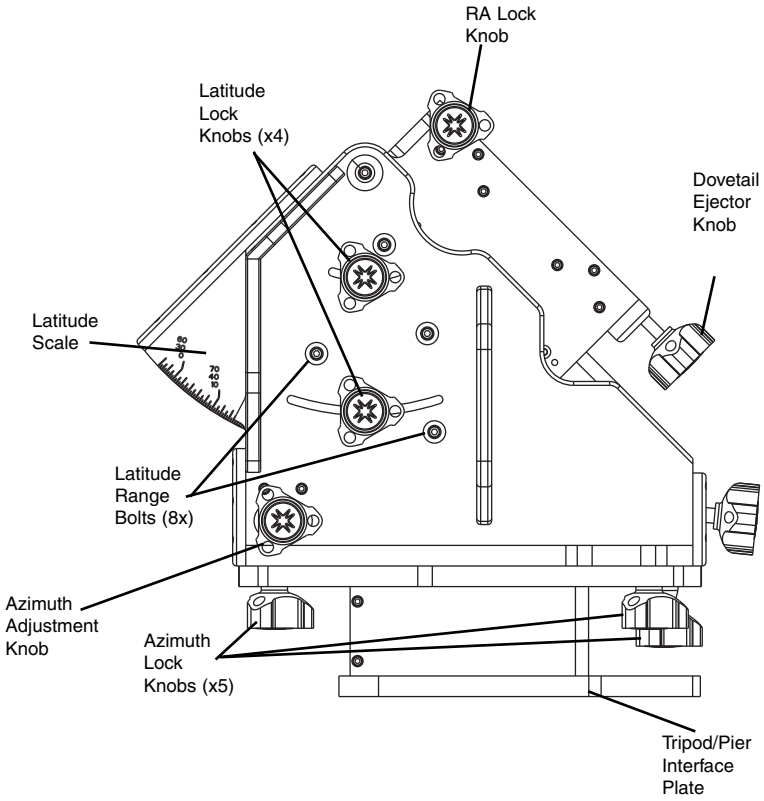
Note:
Your telescope and mount may look slightly different from the one shown in some of the images in this manual. However, your telescope will still operate as the one described in this manual.



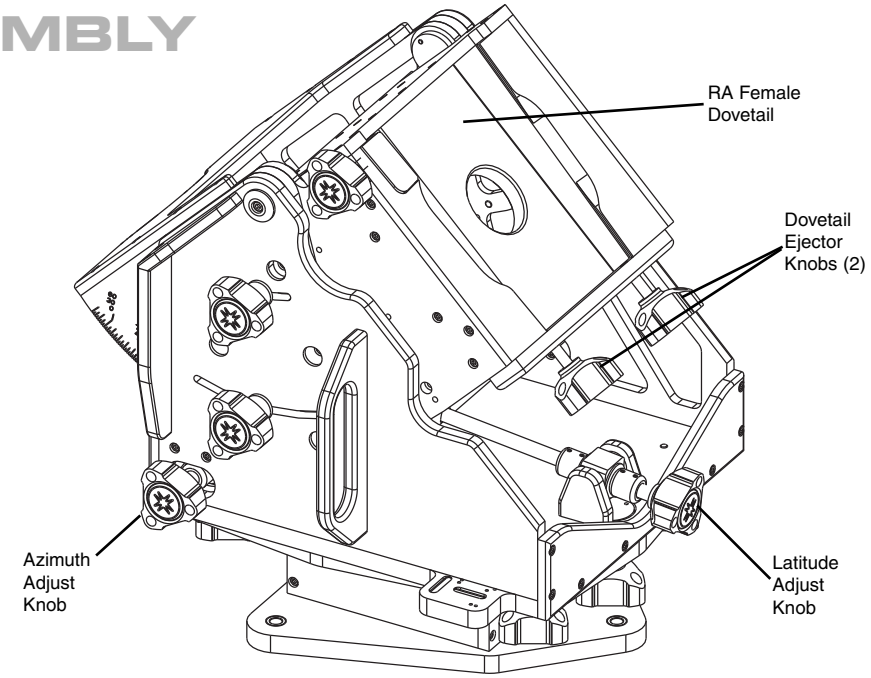
Looking at or near the **Sun** will cause **irreversible** damage to your eye. Do not point this telescope at or near the Sun. Do not look through the telescope as it is moving.

Pedestal Assembly

MAX's Pedestal assembly can be configured to cover three latitude ranges without the need of disassembly. Together, the three ranges allow the mount to operate anywhere on the planet.



PEDESTAL (WEDGE) ASSEMBLY



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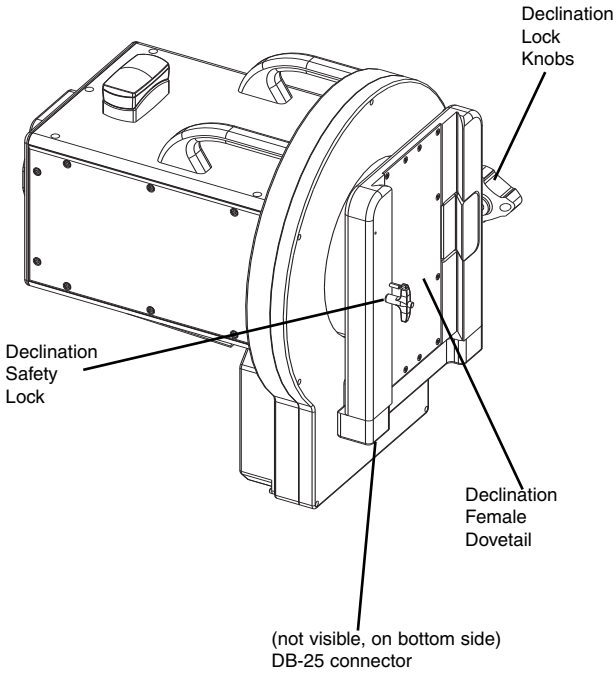
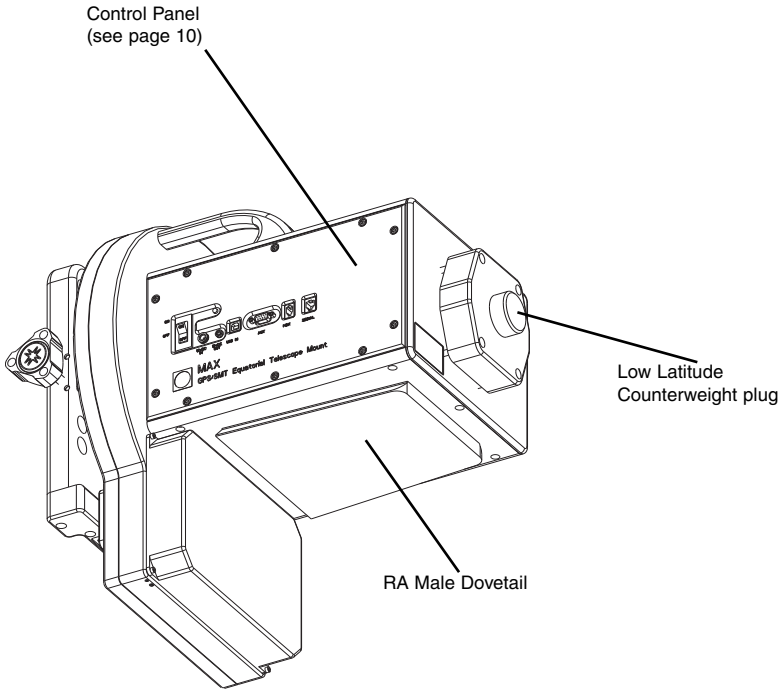
Right Ascension Housing Assembly

The RA Housing mates to the Pedestal easily, sliding firmly into a dovetail block that measures over 100 square inches. When locked in place, this broad footprint assures that your mount will operate as a single rigid block delivering accurate and repeatable pointing and tracking performance. The RA Housing contains Meade's patented Autostar II telescope control system, a massive 13.625" pitch diameter worm gear attached to a 3.84” diameter 6061-T6511 aluminum alloy main shaft supported by one 6020 Ball bearing (5.9055 OD x 3.9370 ID x 0.9449 wide) & one 6013 ball bearing (3.9370 OD x 2.5591 ID x 0.7090 wide) .

THE RA ASSEMBLY





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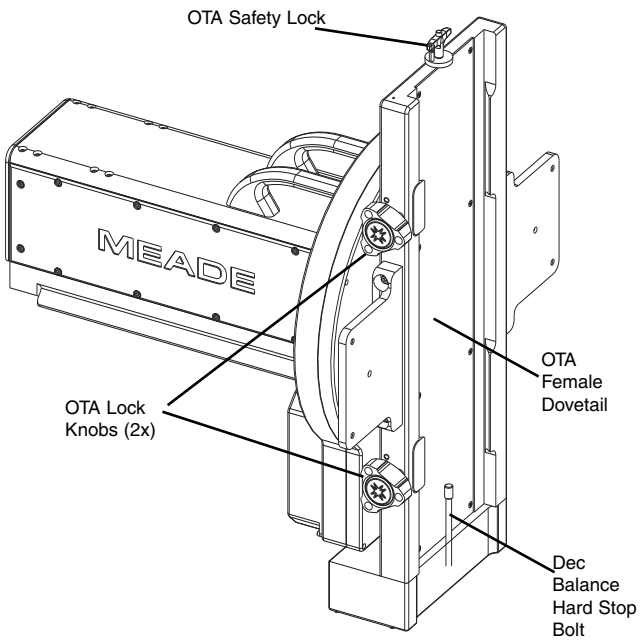
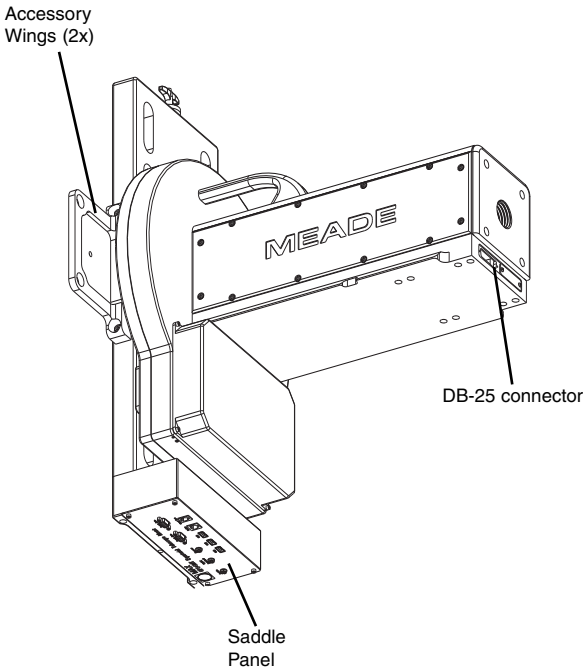
DEC ASSEMBLY

Declination Housing Assembly

The Dec Housing mates to the RA Housing using another huge dovetail block. The RA Housing, DEC Housing and Pedestal are all designed to allow you to track more than 6 degrees past meridian without interference. This mount will let you cover the whole sky. In addition to accepting quick change dovetail plates, MAX has two generous wing mount platforms that will allow you to attach guide scopes, piggy back cameras, short focal length refractors and a wide variety of secondary instruments without interfering with Max's "all sky" design.





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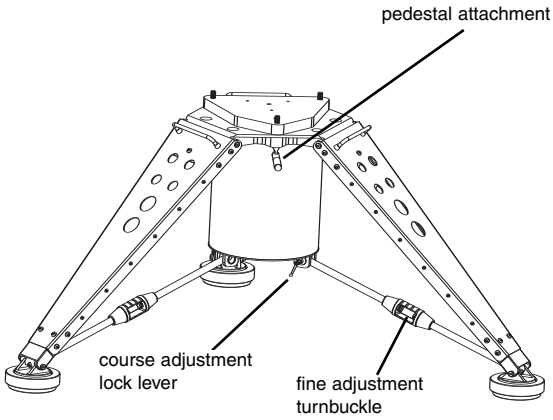
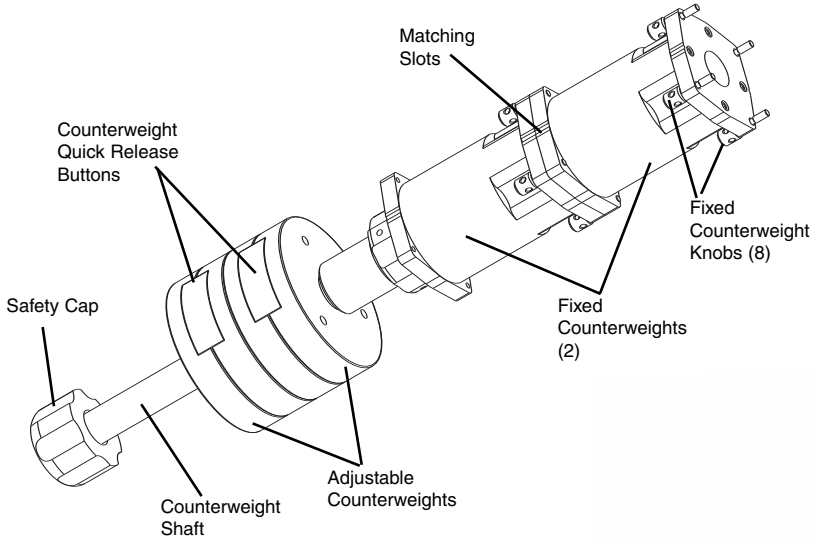


THE TRIPOD

MAX Tripod

The MAX mount tripod can be transported or permanently installed. It provides a wide stance to assure that it can safely carry MAX's massive payload in all orientations, but still collapses down to a size that is easy to handle. Its design assures that despite its wide stance, it will not interfere with optical systems observing on the meridian. Like Max, it sets up, knocks down, and adjusts without the need of tools.



Counterweights

The MAX counterweights are beautifully crafted with sure locking, but quick release, buttons. They allow you to quickly locate balance so you can get back to work.

THE COUNTER-WEIGHTS

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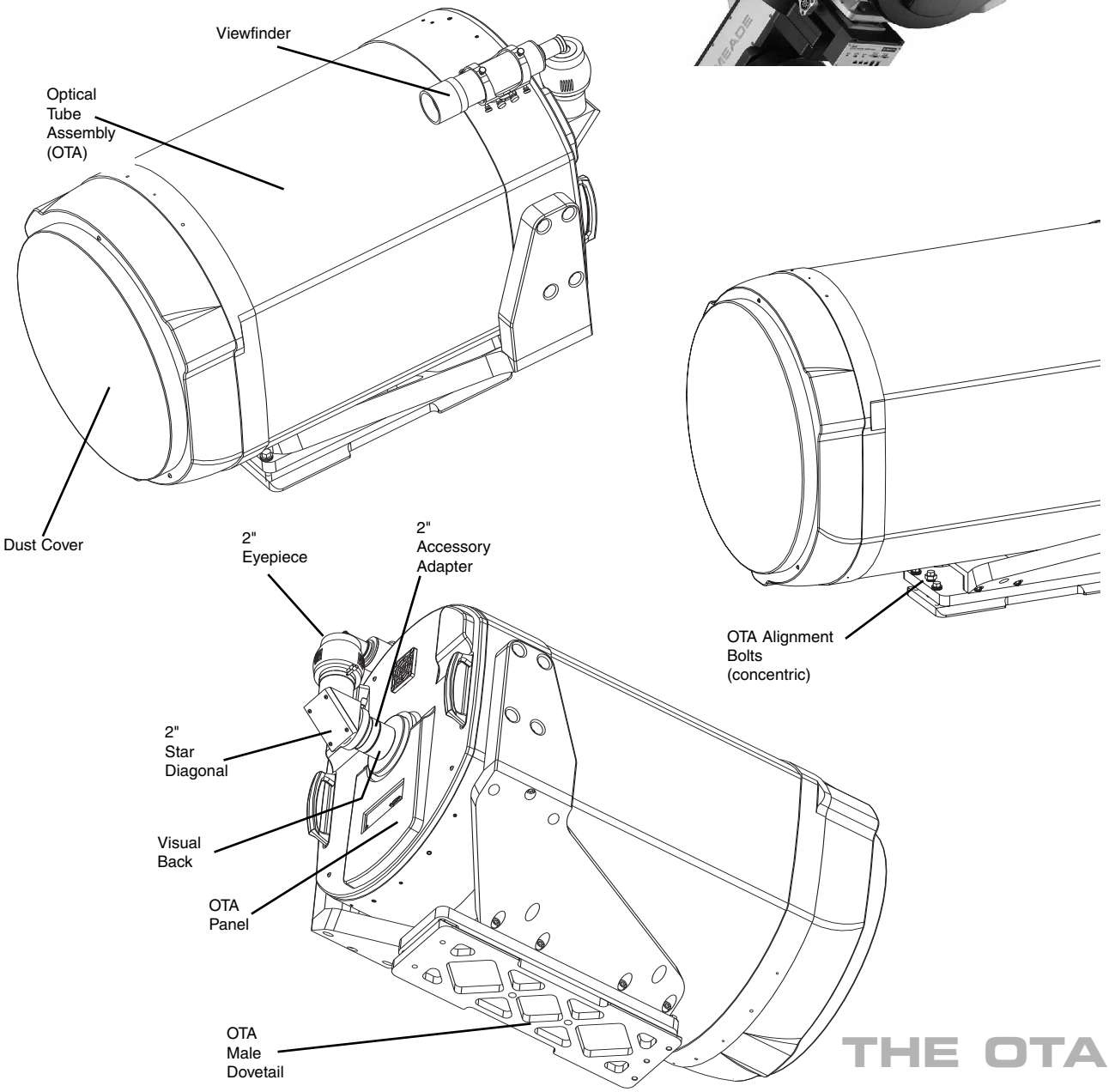
Optical Tube Assembly

MAX is sold stand alone, or it is available bundled with Meade's 16” RCX400™ or 20” RCX400™ Optical Tube Assemblies. RCX OTA's integrate seamlessly with MAX. Together you get pinpoint stars from Meade's unique Advanced Ritchey-Chrétien optical system:

- Zero expansion carbon fiber body
- Advanced Ritchey-Chrétien optics
- Electronic Collimation
- Integrated Dew Heater
- OTA fan for quick cool down
- Digital Electronic Focus with Presets



THE OTA

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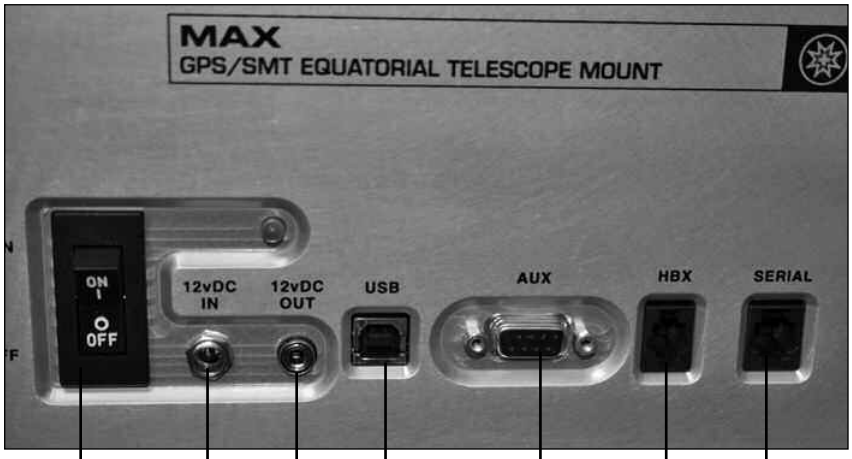
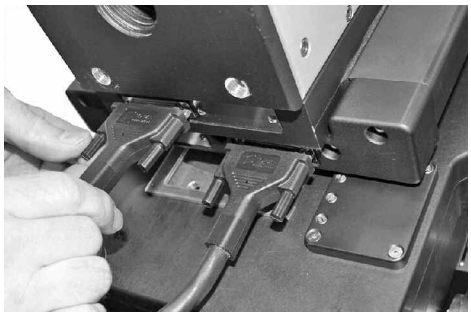
CONTROL PANELS AND PORTS



Off/On | 12vDC In | 12VDC Switched Out | USB Port | AUX port | HBX port (Handbox port) | Serial port

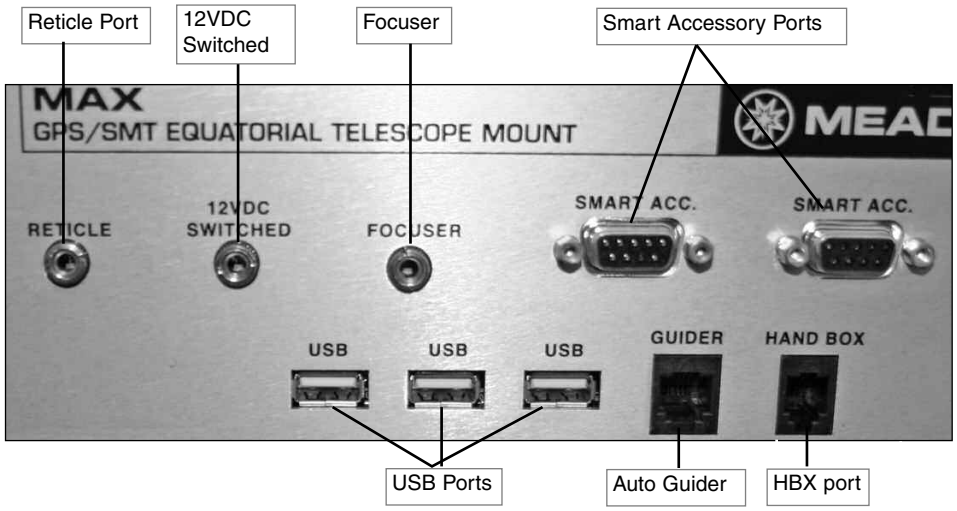
RA ASSEMBLY CONTROL PANEL



RA TO DEC JUMPER CABLE

JUMPER CABLE BETWEEN OTA AND SADDLE PANEL (use one of the Saddle panel Smart Accessory ports)

SADDLE CONTROL PANEL



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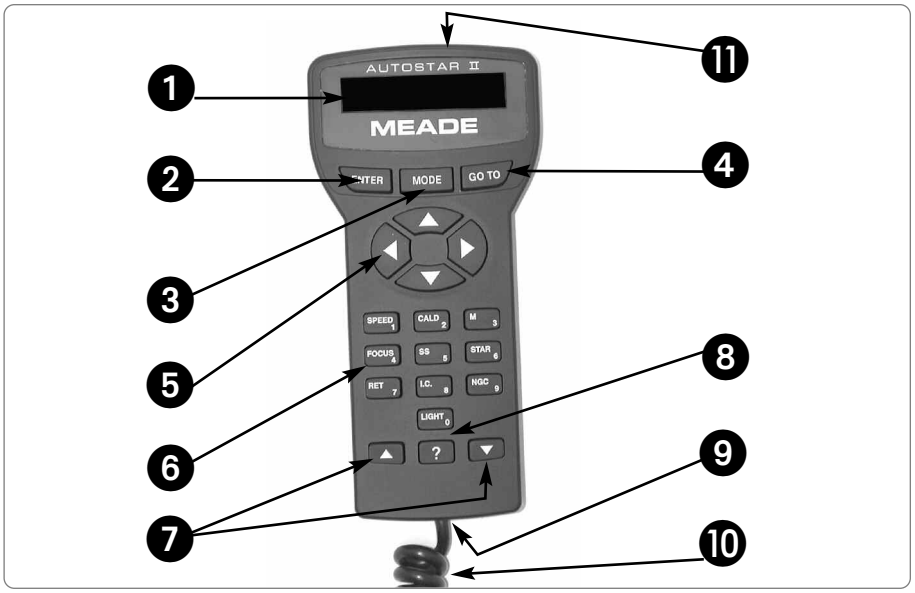

Fig. 2: *The Autostar II Handbox.*

Tour the Cosmos with Just the Push of a Button

Control of Max and RCX400 telescope models is through the operation of the standard Autostar II system. Nearly all functions of the telescope are accomplished with just a few pushes of Autostar II's buttons.

Because the Autostar II system uses flash (rewritable) memory, your system will be able to grow when new features and enhancements become available. Download the latest satellite data, star and object catalogs, tours, serial commands list, and software revisions, directly from the Meade website (**www.meade.com**).

Some of the major features of the Autostar II system are:

- Automatically move the telescope to any of the more than 180,000 objects stored in the object library, including:

Library	# of Objects
New General Catalog (NGC):	7,840
Index Catalog (IC):	5,386
Messier Catalog (M):	110
Caldwell Catalog:	109
Named Objects:	227
Herschel Catalog:	400
Abell Catalog of Galaxy Clusters:	2,712
Arp Catalog of Irregular Galaxies:	645
Uppsala Galaxy Catalog:	12,940
Morphological Catalog of Galaxies:	12,939
General Catalog of Variable Stars:	28,484
SAO:	17,191
Hipparcos Star Catalog:	17,325

....plus more than 10,000 other objects from the Lunar 100, the Washington Star, Gliese, Hickson, PK, Landolt, Lunar Features, and other catalogs!

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The Autostar II system provides control of virtually every telescope function. The Autostar II handbox has soft-touch keys designed to have a positive feel. The LCD (Liquid Crystal Display) is backlit with red LEDs (Light Emitting Diodes) for easy viewing in the dark. The backlit display, key arrangement, and sequential menu structure make Autostar II extremely user friendly.

❶ **2-Line LCD Display:** This screen displays Autostar II's menus and information about the telescope.

- **Top line:** Lists the primary menu.
- **Bottom line:** Displays other menus that may be chosen, menu options, telescope status, or information about a function that is being performed.

❷ **ENTER Key**: Press to go to the next menu level or to choose an option in a menu. The ENTER key is similar to the RETURN or ENTER key on a computer.

❸ **MODE Key**: Press to return to the previous menu or data level. The top menu level is “Select Item." The MODE key is similar to the ESCAPE key on a computer.

Note: *Pressing MODE repeatedly while in the “Select Item” level moves Autostar II to the topmost screen: “Select Item: Object.”*

Note*: If MODE is pressed and held for two seconds or more, information about the telescope's status displays. When the status displays, press the Scroll keys (**7, Fig. 2**) to display the following information:*

• Right Ascension and Declination (astronomical) coordinates
• Altitude (vertical) and Azimuth (horizontal) coordinates
• Local Time and Local Sidereal Time (LST)
• Timer and Alarm Status
• Date
• Site coordinates
• Battery status

Press MODE again to return to the previous menu.

❹ **GO TO Key**: Press to slew (move) the telescope to the coordinates of the currently selected object. While the telescope is slewing, the operation may be aborted at any time by pressing any key except GO TO. Pressing GO TO again resumes the slew to the object. Also, press during the alignment or GO TO procedures to activate a "spiral search."

❺ **Arrow Keys**: The Arrow keys have several functions. Press an Arrow key to slew the telescope in a specific direction (up, down, left, and right), at any one of nine different speeds. See **SLEW SPEEDS**, page 26. Use the Up and Down Arrow keys to move the telescope vertically up and down. The Left Arrow key rotates the telescope horizontally counterclockwise, while the Right Arrow key rotates it clockwise (unless reversed for Southern Hemisphere use).

Also, use the Arrow keys to scroll through numbers 0 through 9 and the alphabet. The Down Arrow key begins with the letter "A;" the Up Arrow key begins with digit "9."

Additionally, use the Arrow keys to move the cursor across the display: Use the Right or Left Arrow key (**5, Fig. 2**) to move the cursor from one number to the next in the display.

❻ **Number Keys:** Press to input digits 0 to 9. Each Number key also has a specific function, which is printed on each key (these are commonly known as "hot buttons"—see page 40):

1 SPEED: Changes the slew speeds. To operate, press Speed and then a Number key (1 is the slowest speed, 9 is highest speed).
2 CALD (Caldwell): Press to display the Caldwell catalog on the Autostar II handbox.
3 M (Messier): Press to display the Messier catalog library.

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4 FOCUS: Toggles between two functions. The first press allows you to change the focus and focus speed. The next press allows you to create presets that tell the telescope where to focus.
5 SS: Press to display the Solar System library.
6 STAR: Press to display the Star library.
7 RET (Reticle): Press to display the Reticle Control menu.
8 IC: Press to display the Index Catalog library.
9 NGC (New General Catalog): Press to display the NGC catalog library.
0 LIGHT: Press to turn on and off the red utility light on the top of the handbox.

❼ **Scroll Keys**: Press to access options within a selected menu. The menu is displayed on the first line of the screen. Options in the menu are displayed, one at a time, on the second line. Press the Scroll keys to move through the options. Press and hold a Scroll key to move quickly through the options.

The Scroll keys also control the speed of text scrolling on the Autostar II display. When text is scrolling, press and hold the Up Scroll key for a faster display speed and the Down Scroll key for a slower display speed.

❽ **? Key**: Press to access the "Help" file. "Help" provides on-screen information on how to accomplish whatever task is currently active.

Press the ? key and then follow the prompts on the display to access details of Autostar II functions in the Help feature. The Help system is essentially an on-screen instruction manual.

If you have a question about an Autostar II operation, *e.g.*, INITIALIZATION, ALIGNMENT, *etc.,* press the ? key and follow the directions that scroll on the second line. When satisfied with the Help provided, press MODE to return to the original screen and continue with the chosen procedure.

❾ **Coil Cord Port**: Plug one end of the Autostar II coil cord (**10, Fig. 2**) into this port located at the bottom of the Autostar II handbox.

❿ **Coil Cord**: Plug one end of the Autostar II coil cord into the HBX port (**F, Fig. 1d**) of the computer control panel of the telescope and the other end into the Autostar II coil cord port. See ❾ above.

⓫ **Utility Light**: Use this built-in red light to illuminate star charts and accessories without disturbing your eye's adaptation to darkness. Press "0" to turn the light on and off.

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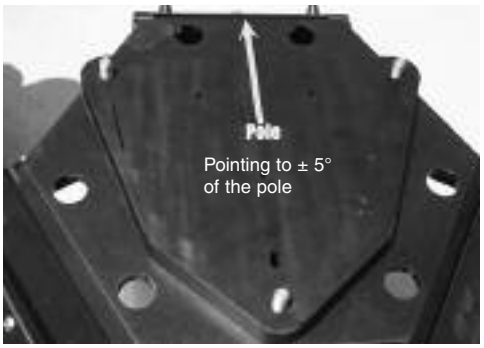
ASSEMBLY

Refer to images pages 4 to 10 for location of various telescope features.

A Phillips screwdriver will be useful during assembly.



1

Tripod Assembly

Before you pull legs out of collapsed tripod, notice the pattern of the pins on top of the tripod (photo). Set the legs so the leg opposite the single pin is pointing North. Above 20° latitude (or South in Southern hemisphere)—if less than 20°, use the Low Latitude kit; see step #24.

2

Set up on a surface of concrete, or if on the ground, must be a solid surface (such as granite).

CAUTION: AVOID GRASS AND DIRT. THE MAX ASSEMBLY WILL SINK INTO GROUND, NOT REMAIN LEVEL AND TIP OVER, CAUSING SERIOUS INJURY TO THE ASSEMBLY AND OBSERVERS.

3

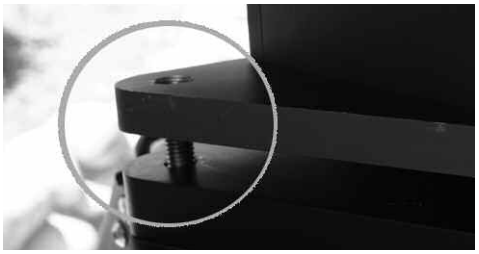
Extend the legs outward.

4

Pedestal Assembly and Adjusting Latitude Position

Mount Pedestal onto the tripod...

CAUTION: THE PEDESTAL REQUIRES TWO PEOPLE TO LIFT THE ASSEMBLY.



5

...Place the Pedestal over three Pedestal lock pins. Note that these pins are spring-loaded and are self-locating.

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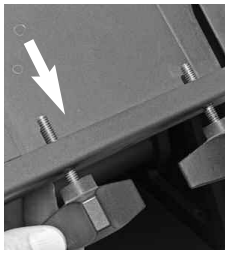
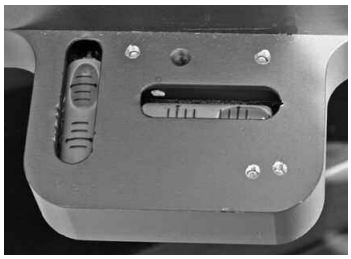
7 Tighten (rotate) the lock knobs below the Pedestal to a "tight" feel.

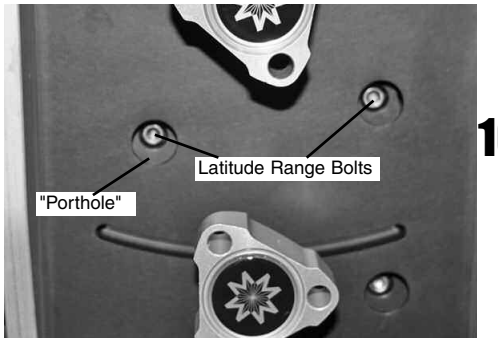


8 Back off the ejector knobs on the Pedestal.

9 Adjust legs until they are level. Adjust the turnbuckle for fine adjustment of level.

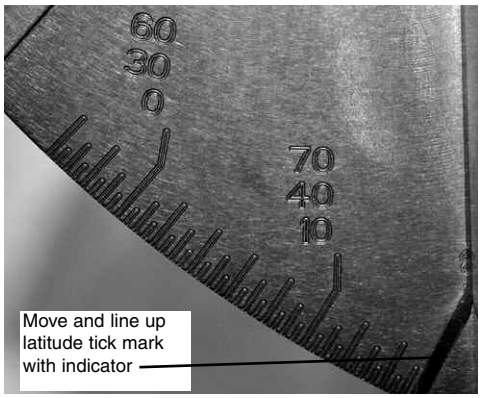
The bubble levels will assist you.





10 The telescope comes set for mid-range latitudes (30° to 60°). If you need to set for low range or high range, remove the 4 latitude bolts from each side of the pedestal (8 total) using a supplied hex wrench (see photo above). The pedestal should now be able to swing freely.

Swing the pedestal so that the bolt portholes match up with another set of bolt holes on the underneath plate (there are three sets of bolt holes, one for each latitude range).



11A Move the pedestal until it lines up your latitude tick mark with the indicator on the latitude scale.

Replace and tighten the latitude bolts. Note: If you are setting for low-range latitude, you will need to replace only three bolts on each side. There isn't a fourth hole on either side.

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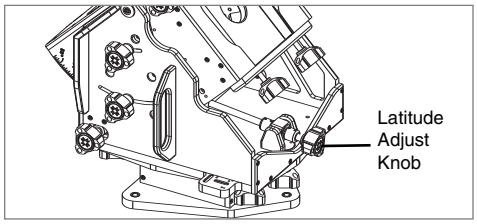
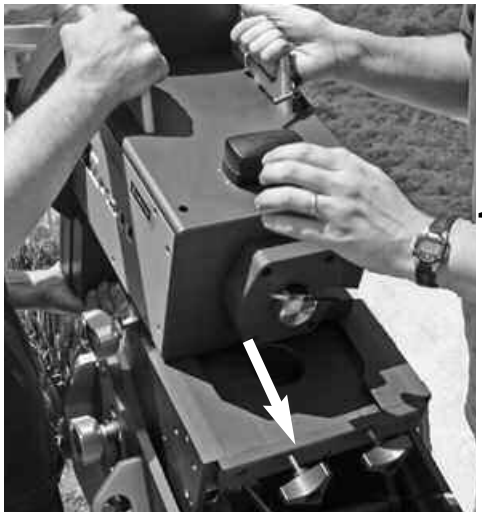


11 Fine tune the latitude adjustment using the Latitude Adjust knob.

B



THE RA ASSEMBLY

Slide the RA assembly onto the Pedestal dovetail.

12 **CAUTION: MAKE SURE THAT YOUR FINGERS ARE CLEAR OF THE TRACK BEFORE YOU SLIDE THE RA ASSEMBLY INTO THE PEDESTAL TRACK. THE RA ASSEMBLY REQUIRES TWO PEOPLE TO LIFT.**

13 Tighten the RA assembly lock knob..

THE DEC SADDLE ASSEMBLY

14 Back off Dec clamp knob. Note, in the photos, the Dec assembly is already shown as attached. However, back off this knob before you attach the assembly.

15 Slide the DEC assembly in from the top.....

A

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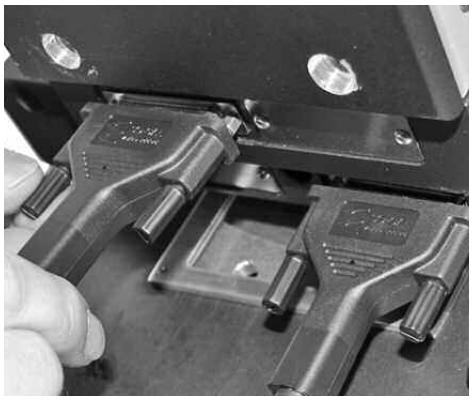
15 ...Slide down to the hard stop.

B

16 Slide safety pin into the hole.

DANGER
Excessive Weight Object.
Serious injury or death can occur if not handled properly.
Multiple person lift required.

17 Retighten the Dec clamp knob.



18 Plug in the RA to Dec jumper cable. **Hint:** You may wish to plug into the RA connector before attaching the DEC Assembly. Then attach the jumper cable to the Dec assembly after it is attached. Some users may find it difficult to reach in below the Dec assembly.

Looking at or near the **Sun** will cause **irreversible** damage to your eye. Do not point this telescope at or near the Sun. Do not look through the telescope as it is moving.

19

ATTACH COUNTERWEIGHTS

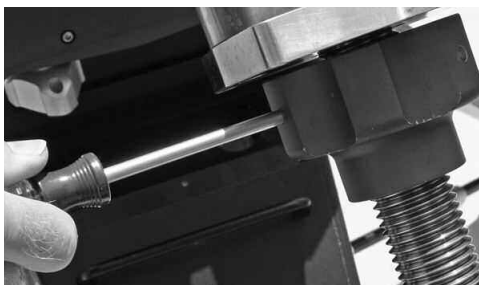
Line up a fixed counterweight's 4 bolts with the four threaded holes in the Dec assembly base. The weights can only be positioned with indentations lined up in a vertical orientation.

20 A

Slide the bolts into the threaded holes and tighten each securing knob by hand until it reaches the top. Then use a 1/4" shaft, such as a Phillips screwdriver to turn the knob very tight.

20 B

Screw in counterweight shaft until it reaches the hard stop.



21

Using a Phillips screwdriver, tighten the screw in the head of counterweight shaft to secure it in place.

Looking at or near the **Sun** will cause **irreversible** damage to your eye. Do not point this telescope at or near the Sun. Do not look through the telescope as it is moving.

22 A Put on adjustable counterweights (three for 20 inch models, two for 16 inch models). The weights can be attached more easily if you make this a two person job. One person holds weight and holds in button. Other person pushes the weight up the shaft-slide up to within one inch of the end of travel. Push counterweights up against one another.

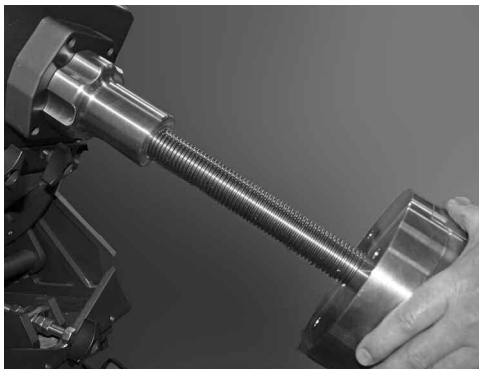
22 B **CAUTION: PAY ATTENTION TO YOUR HANDS AS YOU ATTACH THE COUNTERWEIGHTS SO NOT TO PINCH THEM DURING ASSEMBLY. ALSO TAKE CARE NOT TO DROP COUNTERWEIGHTS. THE COUNTERWEIGHTS CAN CAUSE SERIOUS INJURY IF DROPPED, ESPECIALLY ON THE FOOT.**

DANGER
Excessive Weight Object.
Serious injury or death can occur if not handled properly.
Multiple person lift required.

23 Screw the safety cap on the end of the shaft after the counterweights are attached.

CAUTION: IF THE COUNTERWEIGHT(S) EVER SLIP, THE SAFETY CAP PREVENTS THE COUNTERWEIGHT FROM SLIDING ENTIRELY OFF THE SHAFT. ALWAYS LEAVE THE SAFETY CAP IN PLACE WHEN THERE ARE COUNTERWEIGHTS ON THE SHAFT.

DANGER
Excessive Weight Object.
Serious injury or death can occur if not handled properly.
Multiple person lift required.

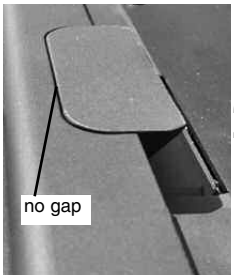


24 **ATTACH LOW LATITUDE COUNTERWEIGHTS**
(OPTIONAL)

If your observing site is within 20° of the equator, you **must** attach the optional counterweight kit. See page 4 to see overview of the assembly.

Attach the adjustable weight shaft and safety cap in the same manner just described .

Looking at or near the **Sun** will cause **irreversible** damage to your eye. Do not point this telescope at or near the Sun. Do not look through the telescope as it is moving.



25 **ATTACH OPTICAL TUBE TO THE DEC SADDLE**
Adjust the clamps so that there is NOT a gap.

26 A The OTA should have its dust cover attached when left stored on the ground in an upright position.

A minimum of four people are needed to lift the optical tube.

DANGER
Excessive Weight Object.
Serious injury or death can occur if not handled properly.
Multiple person lift required.

26 B **DANGER!: MAKE SURE THAT THE COUNTERWEIGHTS ARE ATTACHED BEFORE PROCEEDING WITH THIS STEP. SEE STEPS 17 THROUGH 22.**

IMPORTANT! DANGER!: DUE TO THE WEIGHT AND SIZE OF THE 16" AND 20" OPTICAL TUBES, PLEASE USE EXTREME CAUTION WHENEVER ASSEMBLING, DISASSEMBLING, LIFTING, TRANSPORTING OR STORING THIS PRODUCT. FOUR OR MORE PERSONS (TWO ON EACH SIDE) SHOULD ALWAYS BE USED WHEN ASSEMBLING OR DISASSEMBLING THE TUBE TO THE DEC SADDLE. DISREGARD FOR THE ABOVE WARNING COULD RESULT IN SERIOUS INJURY OR DEATH.

26 C

DANGER
Excessive Weight Object.
Serious injury or death can occur if not handled properly.
Multiple person lift required.

26 D The tube should be lifted up over the low end (the rear) of the assembly and slid into the dec assembly track. If the dovetail clamps were loosened as described in step 25, you will only need to lift the tube halfway over the track in order to slide it in, that is, the tube will fit into the track about halfway down, instead of having to slide it in from the high end.

Looking at or near the **Sun** will cause **irreversible** damage to your eye. Do not point this telescope at or near the Sun. Do not look through the telescope as it is moving.

27

Connect the Smart Accessory port on the Saddle control panel to OTA using the 9-pin jumper cable.

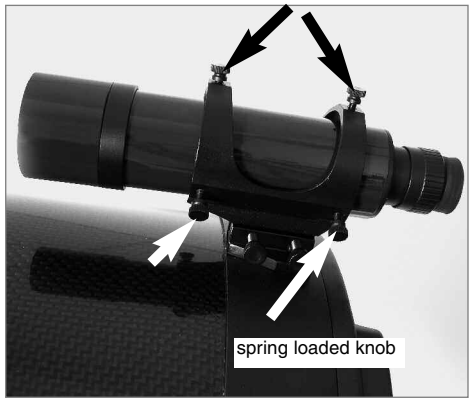
28

ELECTRICAL CONNECTIONS

Attach the OTA cable to the saddle plate. Plug in 12VDC In-make sure power switch is turned off first. Plug in handbox to HBX and plug in any other accessories.

29

Slide in the included 2" accessory adapter, a diagonal eyepiece holder and an eyepiece. Tighten thumbscrews to secure.



30

ALIGN THE VIEWFINDER WITH THE OTA:

(See page 24 to learn how to attach the viewfinder to the telescope.)

During the daytime, point the telescope at a distant object (at least 200 yards away), such as a telephone pole or a street sign. Center the object in the telescope's eyepiece.

Look through the viewfinder and loosen or tighten, as appropriate, one or more of the collimation screws until the viewfinders crosshairs are precisely centered on the object in the OTA. Notice that the left rear knob is spring-loaded, to make the adjustment of the two other rear knobs easier.

31

Fine tune this alignment on a bright star during the nighttime.

Looking at or near the **Sun** will cause **irreversible** damage to your eye. Do not point this telescope at or near the Sun. Do not look through the telescope as it is moving.

32

HOME POSITION AND BALANCING THE OTA

After power is applied and Autostar has initialized, press MODE to move to the vertical home position (32).

CAUTION: BEFORE DISASSEMBLING, THE TELESCOPE MUST BE PUT INTO THE HOME POSITION.

DANGER
Excessive Weight Object.
Serious injury or death can occur if not handled properly.
Multiple person lift required.

33

Before using the telescope, you will need to balance it in both the RA and Dec axes. Before you balance, attach the eyepiece assembly, the viewfinder and **all** the accessories you will be using with the telescope (cameras, guide scopes, etc.). In other words, you need to balance the unit with all the "weight" that will be attached to it.

TO BALANCE THE RA ASSEMBLY:

First you will balance the RA axis. You will balance it, first, with the telescope positioned at a 45° angle and then at a 90° angle perpendicular to the home position).

Use the scroll keys to position the RA axis at 45° (33).

34

Go to the Utilities menu.

Scroll down to "Balance Scope." Press the down arrow key to see the two choices available: Balance RA and Balance Dec. With "Balance RA" displayed, press ENTER.

With "Balance RA" displayed, press ENTER (34). The telescope assembly will move back and forth slightly on the RA axis. It is now determining the torque needed to move on this axis.

35

A balance readout will be displayed on the handbox. The readout will display fractions close to the number one. For example, ".95" and ".91."

Move the bottom adjustable counterweight one-half to one full turn (35). You will only need to move the weights in small increments. Then move the other adjustable counterweights to butt up against it (**Note:** The telescope will continue to move back and forth, while you adjust the weights).

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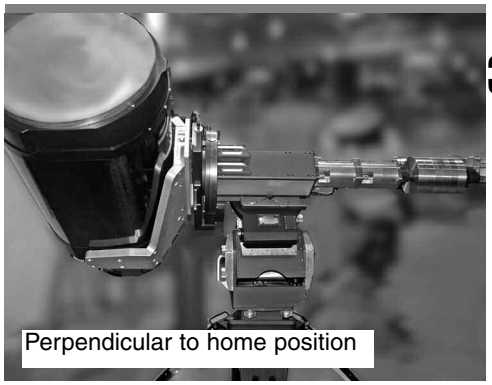


Perpendicular to home position

36 When the display readout is close to "1" (perhaps .99 or 1.01) and remains close to 1 while it is moving, it is balanced. Press MODE. This stops the Balance procedure.

Next move the telescope so that it is 90° perpendicular to the Home Position. Select Balance RA once again and press ENTER.

Repeat the same procedure in the perpendicular position. Once again, move the weights to get the balance readouts to get close to 1.

37 **BALANCE THE DEC AXIS**

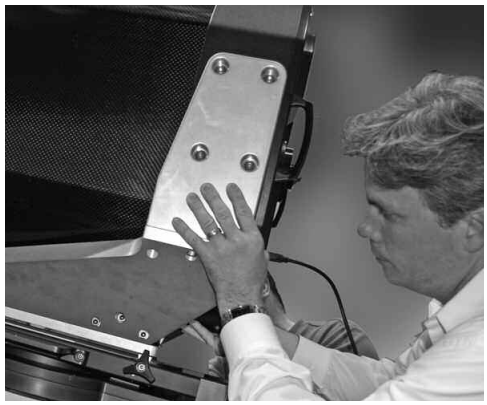
DANGER!!! YOU WILL NEED 4 PEOPLE TO PERFORM THIS PROCEDURE.

Home or 90° position

Next move the telescope so that it is 90° perpendicular to the Home Position (see Fig. 36).

38A Select "Balance Dec" and press ENTER. The Dec axis will move back and forth, like the RA axis did. Check and see how close the Dec axis is from balance.

Press MODE. Move the telescope to the home position. Position 4 people to hold onto the tube securely and loosen the Dec lock knobs. See Fig. 37.



38B Move the OTA forward or backward within the female dovetail track and tighten the lock knobs. Move the telescope back to the position that is 90° perpendicular to the Home Position, as shown in Fig. 36. Select "Balance Dec" and press ENTER. Check and see how close the Dec axis is from "1" in the Dec Balance menu.

Move the OTA back to the Home position. Move the OTA forward or backward again. Continue this procedure, moving back and forth between both the home (Fig. 38A) and the perpendicular position (Fig. 36), and adjust the OTA until the telescope is balanced in this axis. Make sure you tighten the lock knobs after each adjustment of the OTA.

Dec Balance Hard Stop bolt

38C When the axis is finally balanced, press ENTER. Tighten the lock knobs and turn the Dec Balance hard stop bolt so that it butts up against the OTA plate—it remembers your Dec Balance point. You should not have to balance the telescope again unless you change

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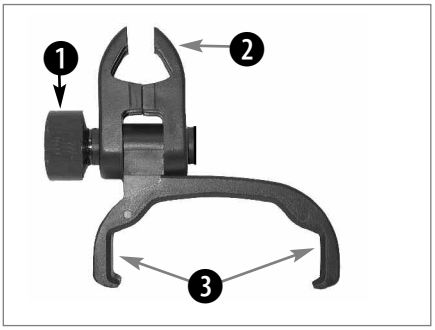

Fig. 39a: *Handbox holder: (1) Lock knob; (2) Clamp; (3)*

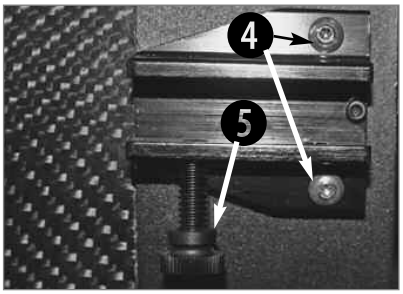

Fig. 40a: *Viewfinder mounting bracket*
assembly : Mounting screws (4), locking screws (5). Remove back locking screw so you can thread in

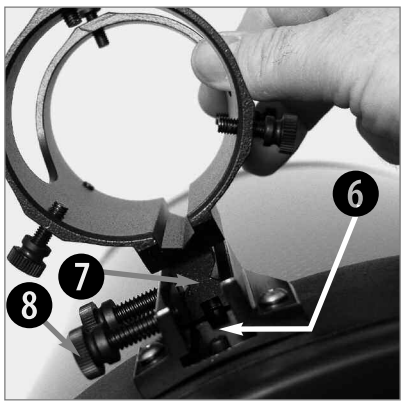

Fig. 40b: *Viewfinder bracket assembly: Slide the track (7) into the mounting slot (6). Tighten the thumbscrews (8) to secure.*

Fig. 40c: *8x50 Viewfinder tube: Objective lens (7), eyepiece/focuser (8) and locking ring (9).*

To Attach the handbox holder:

Remove the handbox holder from the plastic bag. If necessary, loosen the lock knob (**1, Fig. 39a**) and place the clamp (**2, Fig. 39a**) about one of the telescope's handles. Tighten the lock knob to a firm feel. Slide the AutoStar II handbox into the holder (**3, Fig. 39a**).You may also snap the handbox into the holder: Slide one side of the handbox into the holder and then firmly press the other side of the handbox into the holder until it snaps in place. Adjust the tilt of of the holder by loosening the lock knob and then moving the holder clamp to the desired angle. Retighten the lock knob.

To attach the visual back and diagonal mirror:

Attach Visual back and Diagonal mirror: Thread the ring of the 2" accessory adapter over the rear cell and rotate the ring, tightening to a firm feel. Slide the diagonal into the 2" accessory adapter and secure it in place using the visual back thumbscrew.

To **Insert eyepiece:**

Remove the UltraWide 24mm eyepiece from its container and slide it in the diagonal mirror. Tighten the thumbscrew located on the diagonal mirror to a firm feel only.

Mounting and Focusing the Viewfinder for the First Time

The first time you mount and focus the viewfinder, follow the these steps:

1. Attach the viewfinder mounting bracket assembly: The mounting bracket assembly is shipped attached to the viewfinder bracket. Loosen the thumbscrews (**5, Fig. 40a**) and slide the bracket out of the mounting assembly (the photo depicts one thumbscrew removed for the sake of clarity).
2. Place the bracket assembly over the pre-drilled holes on th back outer rim of the telescope, Thread and tighten the two supplied locking screws (**4, Fig. 40a**).
3. Attach the viewfinder bracket: Slide the track on the bottom of the viewfinder bracket into the slot in the viewfinder mounting assembly. See **Fig. 40b**. To secure the viewfinder to the mounting assembly, tighten the two thumbscrews to a firm feel only.
4. Slide the viewfinder tube (see **Fig. 40c**) into the viewfinder bracket. Loosely tighten the adjustment screws (**12, Fig. 40d**). You will use the adjustment screws to align the viewfinder (see page 21).
5. Look through the viewfinder. Rotate the eyepiece/focuser until you sharply focus the crosshairs. Rotate the tube so that the crosshairs align with the Dec and RA axes.
6. Loosen (rotate clockwise) the objective lens locking ring (**11, Fig. 40c**).
7. Rotate the objective lens (**9, Fig. 40c**) until you sharply focus on an object located at infinity.
8. Tighten the locking ring (**11, Fig. 40c**).
9. You may now rotate the eyepiece (**10, Fig. 40b**) to focus on objects.

Align the Viewfinder

During the daytime, point the telescope at a distant object (at least 200 yards away), such as a telephone pole or a street sign. Center the object in the telescope's eyepiece.

Look through the viewfinder and loosen or tighten, as appropriate, one or more of the collimation screws (**12, Fig. 40d**) until the viewfinders crosshairs are precisely centered on the object in the OTA. Notice that the left rear collimation screw is spring-loaded (**12, Fig. 40d)—**you don't need to adjust it—to make the adjustment of the two other rear knobs easier.

Fine tune this alignment on a bright star during the nighttime.

Looking at or near the **Sun** will cause **irreversible** damage to your eye. Do not point this telescope at or near the Sun. Do not look through the telescope as it is moving.

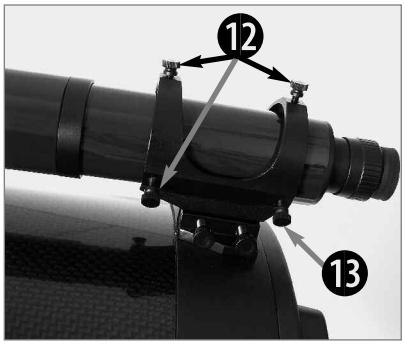

Fig. 40d: Viewfinder adjustment screws (12); spring loaded screw (13)

Fig. 40e: Align the viewfinder on a distant object, such as a light or telephone pole.

Important Note:
Press MODE at any time to exit Focus modes.

Focusing the Telescope

All focusing is performed digitally, using AutoStar II's Focus key (number key 4). The Focus key functions as a toggle key:

- Press the Focus key the first time to focus the telescope eyepiece and to control the speed at which you focus.
- Press the Focus key again to set and adjust up to nine focus presets.

To change the focus speed:

1. Press the Focus key once. "Focuser: Fast (or the current speed)" displays for two seconds. Use one of the Scroll keys to scroll through the list of 5 available focus speeds: Fast, Medium, Slow, Fine, S. Fine. Scroll through the list until the speed you desire displays. Choose a focus speed with which you feel comfortable.

To focus the telescope eyepiece:

1. Press the Focus key once. "Focuser: Fast (or the current speed)" displays. After two seconds, "Focuser: Position = XX" displays. "XX" stands for a number value in decimal millimeters.
2. Point the telescope at a distant object. Look in the eyepiece and use the Arrow keys until the image in the eyepiece is in sharp focus.
3. Press MODE to leave Focus menu.

Presets:

Nine preset focus positions are available, and they operate much like presets on a car radio—everyone can have their own favorite station, or in this case, their own personalized focus. You can set one preset to take into account your own eyesight, one for your observing partner (who may wear glasses), one for your camera's focus, and so forth.

Three preset menus are available. Use the Define Preset menu to assign a preset, use the GoTo Preset menu to select a preset you have previously assigned, and use Sync On Preset menu if **you do not park** your telescope (this menu will reset all your focus presets after you turn off and turn on your scope again).

To define a preset:

1. Point the telescope at a distant object, press FOCUS and use the Up and Down Arrow keys to focus the telescope until the object is sharply focused as previously explained.
2. Press the Focus key again (FOCUS toggles between the Focus menu and the Preset menu). "Focuser Preset: Go To" displays. Use a Scroll key and scroll down the list of options until "Focuser Preset: Define Preset" displays. Press ENTER.
3. A list of presets displays. If no preset is currently assigned, "1- Unnamed" displays (followed by 2- Unnamed, up to 9 - Unnamed).
4. Use the up and down Scroll keys to scroll through the alphabet and the right and left Arrow keys to move to cursor right or left across the display.
5. When you have finished typing in a name and focusing the telescope, press ENTER. That number preset is now defined. You can enter 9 names. For example, you may enter "Joe," "Jill," "Deep Sky Imager" and so forth.
6. To select one of these presets, you will use the "Focuser Preset: Go To" menu.

Focusing Telescopes Equipped with a Microfocuser

To focus telescopes other than an RCX with one of Meade's microfocusers (e.g., LX200 GPS 16"), perform the following procedure. Make sure you have the microfocuser attached to the telescope and plugged into the Focuser port on the saddle plate:

- Press the Number Key 4 and Autostar displays "Saddle Focus: Speed Fast."
- Use the Up/Down keys to scroll through the four microfocuser speeds (fast, medium, slow, fine).
- Use the Up and Down arrow keys to move the focus in or out.

Focusing both RCX focusers and Telescopes Equipped with Microfocusers

If you are using both an RCX and a telescope with a microfocuser (as a guiding

scope), you can use Autostar to control both the RCX and the microfocuser. Make sure you have connected the saddle plate to the RCX and the microfocuser to your telescope and also the saddle plate's Focuser port. Follow this procedure:

- Press the Number Key 4 and Autostar displays "OTA: Fast" displays. You are now in control of the RCX focuser.
- Use the Up/Down keys to scroll through the RCX focuser speeds.
- Press the Number Key 4 again and "Define Presets" displays. Define the RCX presets as described earlier.
- Press the Number Key 4 and Autostar displays "Saddle Focus: Speed Fast." You are now in control of the microfocuser focuser.
- Use the Up/Down keys to scroll through the four microfocuser speeds.
- Use the Up and Down arrow keys to move the focus in or out.

Important Note:
Press MODE at any time to exit Focus modes.

Press MODE to exit the Focus menu at any time.

To select a previously defined focus preset

1. Press the Focus key twice. “Focuser Preset: Go To Preset” displays. Press ENTER to select this menu.
2. Use a Scroll key and scroll down the list of previously defined presets. When the desired preset displays (for example, “Deep Sky Imager”), press ENTER.

   Important Note: *If* ***you do not park your telescope****, you will need to select one of the presets and refocus your telescope using the Sync On menu. See* ***TO SYNC ON A FOCUS PRESET*** *below****.***

To sync on a focus preset

If **you park your telescope**, AutoStar II remembers all the focus positions you defined as presets and you will not need this menu.

If **you do not park your telescope**, you will need to select just one of the presets and refocus your telescope using the Sync On menu. Then AutoStar II will reset all the other presets back to the focus preset positions you previously defined.

1. Press the Focus key twice. “Focuser Preset: Go To Preset” displays. Use a Scroll key and scroll until “Focuser Preset: Sync On Preset” displays and press ENTER to select this menu.
2. Use a scroll key to choose one of the previously entered presets from this list (the most likely preset you will choose will be one that accounts for your own eyesight).
3. Use the Up or Down Arrow keys to focus the eyepiece.
4. Press ENTER. AutoStar II now “remembers” the relative focus positions of the eyepiece.You can now choose any preset and it will be correctly focused.

To exit the focus operation at any time:

1. Press MODE.

Slew Speeds

Autostar II has several slew speeds that move the optical tube at rates that are directly proportional to the sidereal rate and have been calculated to accomplish specific functions. Press the Speed key (Number key "1") and then press a Number key to change the slew speed, which is shown for about two seconds on Autostar II’s display.

The available speeds are:

Number Key 1=	0.01x to1.0x sidereal, variable in 0.01x increments Guide Rate		
Number Key 2	=	2x =	2 x sidereal (0.5 arc-min/sec or 0.008°/sec)
Number Key 3	=	8x =	8 x sidereal (2 arc-min/sec or 0.033°/sec)
Number Key 4	=	16x =	16 x sidereal (4 arc-min/sec or 0.067°/sec)
Number Key 5	=	64x =	64 x sidereal (16 arc-min/sec or 0.27°/sec)
Number Key 6	=	128x =	128 x sidereal (32 arc-min/sec or 0.25°/sec)
Number Key 7	=	.5° =	45 arc-min/sec or .5°/sec
Number Key 8	=	1° =	60 arc-min/sec or 1°/sec
Number Key 9	=	Max Slew Speed (2°/sec)	

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Aligning for the First Time

If you wish to have precise pointing accuracy, the first time you align your telescope you will need to align it to using **Automatic Alignment** and **Drift Alignment**. You will then electronically collimate the telescope, square the OTA and finally calibrate home. Once you do this. you will need only to park your scope and you will keep this alignment. When you turn the telescope back on after parking, it will be very nearly perfectly aligned from this point on.

Important Note:
First time you align the telescope, perform the following procedures to insure precision pointing:

1. Automatic Align
2. Drift Align
3. Collimation
4. OTA Align
   (if non -RCX model)
5. Calibrate home.

To prepare your telescope for Automatic Alignment:

1. Connect Autostar II to the HBX port of the RA Control Panel (or Dec Control Panel).
2. Flip the power switch of the RA Control Panel to the ON position.

   The Autostar II screen is activated and a copyright message displays briefly.
3. "Press 0 to Align or Mode for Menu" displays. Press 0.
4. The telescope will seek the home position. Autostar II initializes the Smart Drive. The R.A. and Dec. motors operate briefly and "Initializing: Smart Drive" displays.
5. "Automatic Alignment" displays. Press ENTER. The system now performs the following routines (press any Autostar II key to abort Automatic Alignment) :

   Attempts a "GPS Fix." The RCX400's GPS receiver attempts to acquire and sync up with signals from GPS satellites.

   After performing these operations, Autostar II now knows:

   - The telescope's limiting positions
   - The observing site's location
   - The date and time
6. "CTR Polaris: Slewing" displays. When the telescope stops slewing, **center Polaris in the eyepiece using only the latitude and azimuth adjust knobs (see Fig. 41a). DO NOT USE THE HANDBOX TO CENTER POLARIS.** When Polaris is centered, press ENTER.
9. Autostar II then chooses another star to align upon. "Searching...." displays. The telescope then slews to a bright star for alignment. If it does not appear in the field of view in the eyepiece, look through the viewfinder—in most cases, the star will be visible. Use the Arrow keys to move the telescope until the star is visible and centered in the eyepiece. The alignment star should be easily recognized and be the brightest star in the area of the sky where the telescope is pointing. Press ENTER. "Align Successful" displays. If "Align Unsuccessful displays," repeat the procedure.

   Next, you will drift align the telescope.

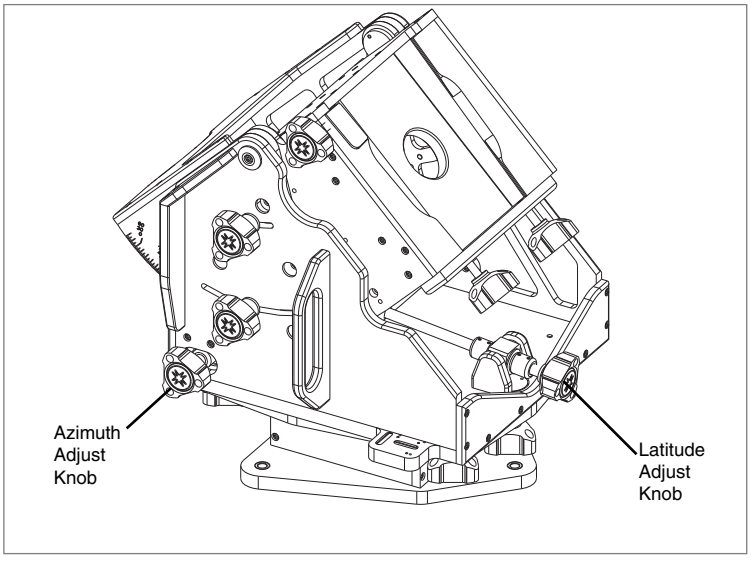

Fig. 41a: The latitude and azimuth adjust knobs.

Looking at or near the **Sun** will cause **irreversible** damage to your eye. Do not point this telescope at or near the Sun. Do not look through the telescope as it is moving.

Note:
See:

http://www.astrocruise.com/polarnew.htm

for a website dedicated to drift alignment of Meade telescopes. Site offers extensive tips from an experienced drift align specialist.

How to Drift Align Max (Northern Hemisphere)

Important Note: You will need a reticle to perform this procedure

1. Center your reticle on a bright star near the Eastern horizon.
2. Look through the reticle while pressing Autostar's right and left Arrow keys. This will slew the mount back and forth in the R.A. axis.
3. Loosen and rotate the reticle until one of the crosshairs matches the right-left path of the star as you press the Arrow keys. This crosshair is now on the R.A. axis. The other axis is therefore on the Dec. axis. Carefully secure the reticle in place (do not move the crosshairs).
4. Observe the bright star you have chosen. If, over time, it drifts off the R.A. axis, use the latitude adjustment knob to bring it back *past* center. Experience will teach you how much to move the alt knob. If the star drifts slowly, use only a small amount of correction; if it moves quickly, use a much larger amount of correction.
5. Use Autostar's up and down keys to bring the star back to center. Perform step 4 repeatedly until it does not drift on the Dec axis for a few minutes.
6. Next, center on a bright, Southern star. This star should be within 10° to 20° of the celestial equator.
7. If the star drifts above the RA axis, use the Azimuth adjustment knob to move the star to the right and down until the star is almost out of the field of view. If it drifts below the R.A. axis, use the Azimuth adjustment knob to move the star to the left and up.
8. Use Autostar arrow keys to center the star again. Repeat steps 7 and 8 until the star no longer drifts off the R.A. axis for a few minutes.
9. Go back and check the first star and see if it is drifting again. And then recheck the second star also. Keep repeating steps 4, 7 and 8, until there is no more drift in either of the stars you have chosen for a few minutes.

Your telescope is now drift aligned. Next, collimate your telescope.

Collimation

This collimation procedure is for Meade RCX models only. The optical collimation (alignment) of any astronomical telescope used for serious purposes is important, but in the case of the RCX design, such collimation is absolutely essential for good performance. Take special care to read and understand this section well so that your telescope will give you the best optical performance.

As part of final optical testing, every Meade RCX400 telescope is precisely collimated at the Meade factory before shipment. However, vibrations in shipping can cause the optical system to become misaligned. Re-aligning the optics is, however, a straightforward process with the RCX400.

Test your Collimation
Before collimating an RCX400 model, you will need to test your collimation.

To test the collimation, center a bright star that is overhead, or use a “hot spot” of reflected Sunlight from a chrome car bumper, with the supplied 24mm eyepiece. Allow the telescope to adjust to the temperature of your observation site before proceeding; temperature differences between the optics and the outside air can cause distortion in the images. Autostar II offers two options in the Utilities menus that take temperature readings: “OTA Temperature” (the temperature of the corrector plate) and “Ambient Temperature” (the temperature of the air around the fork arms).

When the star or hot spot is centered, de-focus the image. You will notice that the out of focus star image looks like a ring of light surrounding a dark central spot; the dark central spot is in fact the shadow of the secondary mirror. You may notice multiple rings; these are called diffraction rings. Focus until the diffraction rings fills about 10% of the eyepiece field-diameter. If the dark central spot is offset in (i.e., not concentric with) the diffraction rings, your telescope’s optical system is misaligned and requires collimation.

Looking at or near the **Sun** will cause **irreversible** damage to your eye. Do not point this telescope at or near the Sun. Do not look through the telescope as it is moving.

Follow these steps for collimation of the optical system:

The only adjustments possible, or necessary, on the RCX400 models is performed with the AutoStar handbox. No adjustment screws are necessary (or provided), as with traditional telescopes. A high-powered eyepiece, such as a 9mm eyepiece, or a 9mm eyepiece with a 2x barlow, is required for collimation. A good rule of thumb to follow is to select the highest power eyepiece you will use with your telescope, and double it (a 2x barlow is ideal for doubling). See **Fig. 42a** below, to see images of an aligned and misaligned image.

a. Select the "Collimation" option in the Setup/Telescope menu. Once this option is selected, you will be able to use Autostar's Arrow keys to adjust the image of the star you have selected.

b. While looking through the eyepiece, Use Autostar II's Arrow keys at the slowest slew speed, begin to move the defocused center ring so that the rings become more concentric. You will most likely need to press more than one Arrow key.

c. You will notice that the star image will move across the field of view of the eyepiece. If while using the Arrow key, the defocused star image moves out of the eyepiece field, press MODE to temporarily leave the collimation menu.

d. When you have left the "Collimation" menu, use the Arrow keys to bring the image back to the center of the eyepiece field.

e. Press ENTER to select the "Collimation" option again.

f. Use the Arrow keys to continue to adjust the image until it becomes concentric. If the image moves out of the eyepiece field, perform steps c through e as many times as necessary.

g. Carefully examine the concentricity of the diffraction rings. Always double check the image in the center of the field of the eyepiece. The star point should appear as a small central dot (commonly referred to as an "Airy disc") with a diffraction ring surrounding it. You now have the best alignment of the optics possible with this telescope.

Set Default and Restore Default Options: The factory has collimated your telescope and saved the settings in the Restore Default option. You may retain this setting and recall it if the telescope needs collimation. Or you may **overwrite** this setting using the Set Default option after performing precise collimation and recall it again when needed with the Restore Default option.

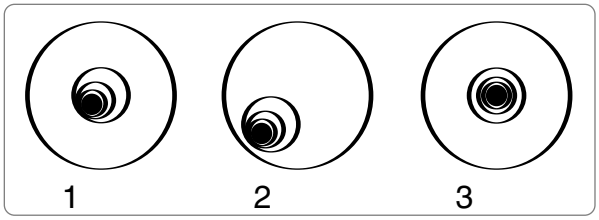

Fig. 42a: *Defocused star images. Misaligned (1, 2), Aligned (3).*

Align (Squaring) the OTA: If you are using a non-RCX telescope or if you have changed your RCX collimation or mounting significantly from the factory defaults, you **must** align the OTA. When you select this menu, Autostar will ask you to center two stars in the telescope that are on opposite sides of the sky.

Once you have centered them, the telescope will slew back to the first star. You will then be asked to center the star using the OTA align bolt. These are two bolts, with one in the center of the other. Using a 9/16 flat wrench, loosen the center bolt and hold this one so it doesn't move. Then place 13/16 open ended or combination spanner wrenches on the outer bolt. Turn the outer bolt until the star is centered. When centered, tighten just the center bolt. This will hold the bolts securely in that position.

Note that there is a bolts on either side of the OTA align bolt (Fig. 42b). These bolts must be loosened during the procedure and tightened afterward.

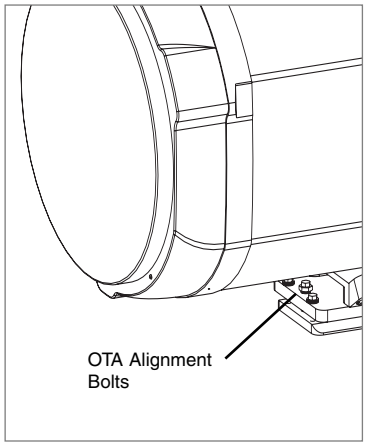

Fig. 42b: *The OTA align bolt.*

Looking at or near the **Sun** will cause **irreversible** damage to your eye. Do not point this telescope at or near the Sun. Do not look through the telescope as it is moving.

Calibrate Home:

After aligning your telescope, select this menu and the alignment settings—North, time, alignment stars—are stored in Autostar II's memory and are remembered after you power off the telescope. After Calibrating Home, you may park your telescope any time you wish and the next time you turn on the telescope, you will be precisely aligned.

Parking the Scope

Designed for a telescope that is not moved between observing sessions. Align the telescope one time, then use this function to park the telescope. Once parked, the screen prompts to turn off power.

The advantage of parking is that you do not need to align the telescope the next time you turn on Autostar; it remembers your alignment. **Tip:** When waking their telescope, some users select a bright star from the Objects menu and perform a Go To on that star. If the star is not in the exact center of the eyepiece, move the star to the center using the arrow keys and then hold ENTER down for more than two seconds. This activates the Enter to Sync function and fine tunes and improves the telescope's alignment.

> ***Important Note:*** *When the "Park Scope" option is chosen and the display prompts you to turn off the telescope's power, Autostar II is unable to be returned to operation without turning the power off and then back on.*

Most users just need to place the telescope in the home position (default park position) and select Park from the Autostar II menu to park their scope.

However if you are storing your telescope in a location where it cannot be stored in the home position, for example, such as an observatory with a top that slides back, just move your telescope to the position you want to store it. Choose "Park Position" from the Setup: Telescope menu. When "Park Position" displays, use the down arrow key to scroll through the choices. Select "Use Current" if your position is anything other than the Home Position. If you are using the Home Position, select "Use Default."

Looking at or near the **Sun** will cause **irreversible** damage to your eye. Do not point this telescope at or near the Sun. Do not look through the telescope as it is moving.

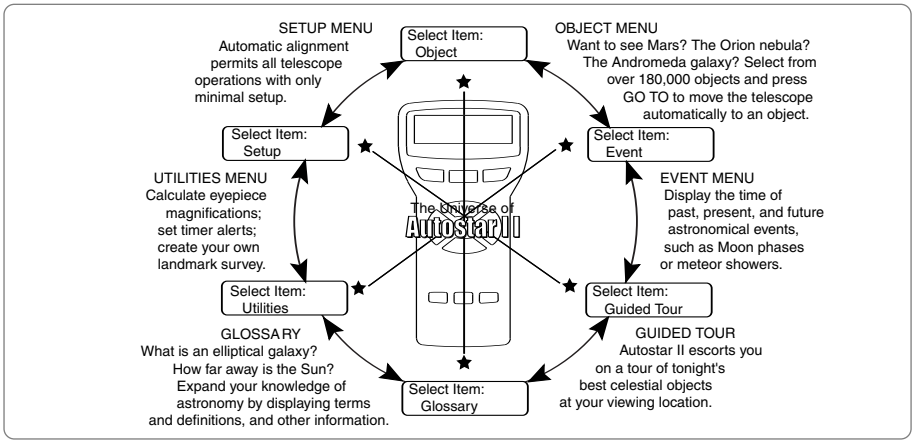
SETUP MENU
Automatic alignment permits all telescope operations with only minimal setup.
Select Item: Object
OBJECT MENU
Want to see Mars? The Orion nebula? The Andromeda galaxy? Select from over 180,000 objects and press GO TO to move the telescope automatically to an object.
Select Item: Setup
Select Item: Event
UTILITIES MENU
Calculate eyepiece magnifications; set timer alerts; create your own landmark survey.
The Universe of Autostar II
EVENT MENU
Display the time of past, present, and future astronomical events, such as Moon phases or meteor showers.
Select Item: Utilities
Select Item: Guided Tour
GLOSSARY
What is an elliptical galaxy? How far away is the Sun? Expand your knowledge of astronomy by displaying terms and definitions, and other information.
Select Item: Glossary
GUIDED TOUR
Autostar II escorts you on a tour of tonight's best celestial objects at your viewing location.

Fig. 45: *The Autostar II Universe: The six primary categories listed in the Select Item menu of Autostar II.*

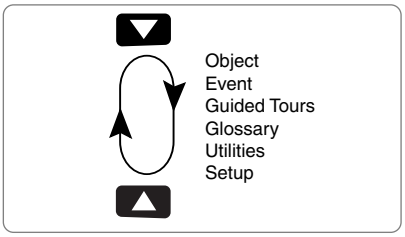

Fig. 43: *Menus set in a loop.*

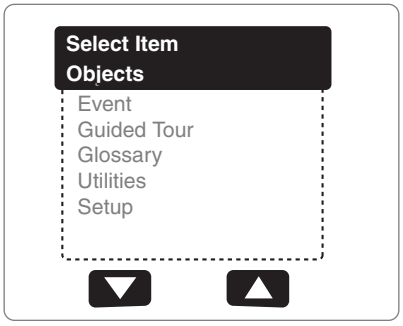

Fig. 44a: The menu displays on the top line and *Menu options display on the second line. Use the Scroll keys to move up or down through the list of options. Press ENTER to select the desired option.*

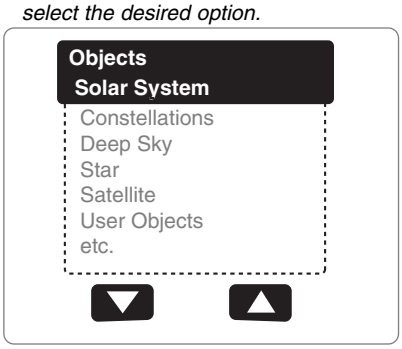

Fig. 44b: *Object menu is selected by pressing ENTER. Use the Scroll keys to move up or down through the list of options for the Object menu. Press ENTER to select the desired option.*

It is important to understand that menu selections are set in a loop (**Fig. 44***).* This means that pressing the Scroll Down key cycles down through all the available options within a given category, then returns to the first option. The Scroll Up key cycles up through the options in the opposite order. Note that this capability is a quick way to get to an option that is near the bottom of the list. The following example demonstrates this capability.

Example:
To navigate to the “Select Item: Setup” menu option when the “Select Item: Object” menu is displayed:

1. Press the Scroll Down key five times or the Scroll Up key once.

The screen in **Fig. 44a** displays two lines of information. The top line shows the current menu, "Select Item." The second line displays an option within that menu, "Object."

Some options are choices that select the next menu level down. The Scroll keys move up and down within the list of available options, showing one option at a time. The example in **Fig. 44a** shows the Select Item menu with the Object option displayed on the second line.

When the desired option (Object) is displayed on the second line, press the ENTER key to choose that option and move down one menu level. In the example, press Enter and the display now reads "Object: Solar System." You have moved down to the Object menu level. See **Fig. 44b**. You can now use the up and down keys to scroll through the other options available for the Objects menu: Constellations, Deep Sky, etc.

Press the MODE key to leave a menu level; *e.g.,* the wrong menu option is chosen.

> ***Important Note:*** *No matter how many levels into Autostar II are traveled, each press of the MODE key moves up a level, until the top level, "Select Item," is reached. Once in the Select Item level, press MODE to return to the topmost level, "Select Item: Object."*

Autostar II Navigation Exercise

To demonstrate how the Autostar II menu structure works, the following exercise calculates Sunset time so an evening observing session can be planned.

To Calculate Sunset time:

1. Press the MODE key several times, until “Select Item: Object” is displayed.
2. Press the Scroll Down key once to display the “Event” option in the “Select Item” menu.
3. Press the ENTER key to choose the "Event" option and move down a level. "Event: Sunrise" is displayed.

Looking at or near the **Sun** will cause **irreversible** damage to your eye. Do not point this telescope at or near the Sun. Do not look through the telescope as it is moving.

4. Press the Scroll Down key once to display the "Sunset" option in the Event menu.
5. Press the ENTER key to choose the "Sunset" option and move down another level.
6. Autostar II calculates the Sunset time based on the current date, time, and location. Autostar II then displays the results of the calculation.
7. Press MODE once to start moving back up through the Autostar II levels. The first level up is the Event menu.
8. Press MODE again to move up another level. This is the top level, "Select Item."
9. Press MODE again to return to the starting point of "Select Item: Object."

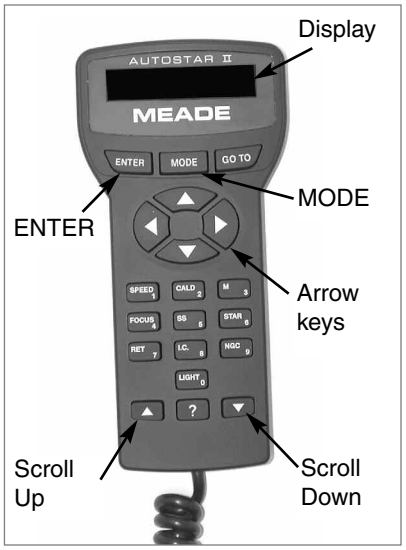

Fig. 45: *Some of the features of the Autostar II handbox.*

Example of Locating a menu

As you typically will be using menus after you initialize and align your telescope, this example will assume you have just completed aligning your scope. AutoStar II displays “Select Item: Object” after the alignment procedure; this will be our starting point. In this example, we will locate the “Owner Info” option. See **Fig. 45** for the location of the Autostar II keys used in this example.

1. “Select Item: Object” displays.
2. As the Owner Info option is in the Setup menu, you will have to use one of the Scroll keys to navigate through the list of menus. Press the Scroll Down Key. “Select Item: Event” displays
3. Keep pressing the Scroll Down key. Notice that all the menus display as you press the key: Guided Tour, Glossary, Utilities, Setup. Stop when “Select Item: Setup” displays. If you press the Scroll Down key one more time, “Select Item: Object” will display again. This is because the list of menus or options cycles through each choice over and over again when you press one of the Scroll keys.
4. With “Select Item: Setup” displayed, press ENTER. Pressing ENTER selects the menu or option currently displayed.
5. “Setup: Align” displays.
6. Press the Scroll Down key again. “Select Item: Telescope” displays. Press ENTER. Autostar II will now display all the choices that are available with the Telescope menu.
7. Continue to press the Scroll Down key until “Setup: Owner Info” displays.
8. Press ENTER. “Owner Info: Name” displays. Press ENTER again. “Name” displays, with the second line blank. On this line you may enter your first and last name into Autostar II’s memory.
9. Press the Up or Down Arrow key. Notice that a letter of the alphabet displays. Continue to press one of the Arrow keys until the first letter of your name displays.
10. Use the Right Arrow key to move to the next position so you can choose the second letter of your name. Continue to use the Arrow keys to enter your full name.
11. Press ENTER when you are finished. Your name is now entered into AutoStar II’s memory.
12. “Owner Info: Name” displays again (if you wish, you can press the Scroll Down key—“Owner Info: Address” will display and you can enter your address if you wish).
13. Press MODE and “Setup: Owner Info” displays. Press MODE again. “Select Item: Setup” displays. MODE allows you to backup and exit through the menu structure.

Navigating Autostar II

Autostar II's menus are organized for quick and easy navigation:

- Press ENTER to go deeper into Autostar II's menu levels.
- Press MODE to move back toward the top menu level.
- Press Number key "1" to engage the Speed mode, and then press Number keys 1 through 9 to change speeds.
- Press Number key "4" to access the Focus menus.
- Press Number key "7" to access the Reticle menu.
- Press the Scroll keys to move up and down through the options or lists.
- Press the Arrow keys to move the cursor across the display.
- Press the Help (?) key to access on-line help.

Tip:
When multiple choices are available within a menu option, the current option is usually displayed first and highlighted by a right pointing arrow (>).

Looking at or near the **Sun** will cause **irreversible** damage to your eye. Do not point this telescope at or near the Sun. Do not look through the telescope as it is moving.

Looking at or near the **Sun** will cause **irreversible** damage to your eye. Do not point this telescope at or near the Sun. Do not look through the telescope as it is moving.

- Select Item
  - Object
    - Solar System
      - Mercury
      - Venus
      - etc.
      - Moon
      - Asteroids
      - Comets
    - Constellations
      - Andromeda
      - etc.
    - Deep Sky
      - Named Objects
      - Galaxies
      - Nebulas
      - Planetary Neb.
      - etc.
    - Star
      - Named
      - SAO Catalog
      - etc.
    - Satellite
      - Select
      - Add
      - Delete
      - Edit
    - Identify
    - Browse
      - Start Search
      - Edit Parameters
- Select Item
  - Event
    - Sunrise
    - Sun Transit
    - Sunset
    - Moonrise
    - Moonset
    - Moon Phases
      - Next Full Moon
      - Next New Moon
      - Next 1st Qtr
      - Next 3rd Qtr
    - Meteor Showers
      - Quadrantids
      - etc.
    - Solar Eclipse
    - Lunar Eclipse
    - Autumn Equinox
    - Vernal Equinox
    - Winter Solstice
    - Summer Solstice
- Select Item
  - Guided Tour
    - Tour Objects
      - Tonight's Best
      - How Far is far
      - etc.
- Select Item
  - Glossary
    - A
      - Accretion Disk
      - etc.
    - B
    - C
    - etc.
- Select Item
  - Utilities
    - Balance OTA
    - OTA Fan
    - Dew Heater
    - OTA Temperature
    - Ambient Temperature
    - Timer
      - Set
      - Start and Stop
    - Eyepiece Calc
      - Field of View
      - Magnification
      - Suggest
    - Brightest Star
    - Brightness Adjust.
    - Contrast Adjust.
    - Panel Light
    - Aux. Port Power
    - Beep
    - Temperature
    - Battery Alarm
    - Sleep Scoope
    - Park Scope
- Select Item
  - Setup
    - Align
      - Easy
      - One-Star
      - Two-Star
      - Align on Home
    - Telescope
      - Telescope Model
      - Collimation
      - Max Past Meridian
      - Focal Length
      - Max Slew Rate
      - Park Position
      - Calibrate Home
      - Anti-Backlash
      - Train Drive
      - Tracking Rate
      - Guiding Rate
      - Dec Guiding
        - North and South
        - Off
        - North Only
        - South Only
      - Reverse L/R
      - Reverse U/D
      - Home Sensors
      - GPS Alignment
      - RA PEC
      - High Precision
    - Targets
      - Astronomical
      - Terrestrial
    - Date
    - Time
    - GPS-UTC Offset
    - Smart Mount
      - Configuration
        - Off
        - On
        - Train
      - Load
      - Save As
      - Delete
      - Erase
    - Owner Info
    - Clone
    - Download
    - Statistics
    - Reset

- Moon
  - Overview
  - Landing Sites
    - Apollo 11
    - etc.
  - Craters
    - Abbot
    - etc.
  - Mountains
    - Mons Bradley
    - etc.
  - Mare, Lakes
    - Lacus Aestatis
    - etc.
  - Valley, Rills
    - Rima Agatharchid
    - etc.

Hold down MODE for two seconds and the following data displays:

- Right Ascension and Declination coordinates
- Altitude and Azimuth coordinates
- Local Time and Local Sidereal Time (LST)
- Timer and Alarm Status
- Date
- Site coordinates
- Battery status

Hot Buttons
Press the following keys to display the corresponding menu:

Key	Menu
1	Speed
2	Caldwell catalog (C)
3	Messier catalog (M)
4	Focus
5	Solar System (SS)
6	Star library
7	Reticle (RET)
8	Index catalog
9	New General catalog (NGC)

Figure 46: The Complete Autostar II Menu Tree Structure.

Object Menu

Almost all observing with Autostar II is performed using the Object menu category. (***Note:*** *Exceptions include Guided Tour and Landmark Survey.)*

Autostar II contains many libraries of viewable objects, such as stars, planets, comets, nebulae and so forth. When one of these objects is selected from a library, Autostar II moves your telescope (if properly aligned) and points it at the selected object. Six of the most popular libraries can be accessed directly using the hot buttons.

The Object Menu options include:

Solar System: A library of the eight planets (Earth is not included) in order out from the Sun, followed by the Moon, asteroids, and comets (Number key "5").

Constellation: A library of all 88 Northern and Southern Hemisphere constellations. When this menu option is chosen and a constellation name appears on the first line of the screen, press GO TO and the telescope goes to the center of the constellation and will display coordinates. Then, use the Scroll keys to cycle through the list of the most significant stars in the constellation. Then it will display deep space objects and so forth in the constellation.

Deep Sky: A library of objects outside our Solar System such as nebulae, star clusters, galaxies, and quasars.

Star: A catalog of stars listed in different categories such as named, double, variable, or nearby. Also included are the Hipparcos, SAO, HD, and HR catalogs. The Star catalog may also be accessed directly by pressing Number key "6."

Satellite: A library of Earth-orbiting objects such as the International Space Station, the Hubble Space Telescope, Global Positioning System (GPS) satellites, and geosynchronous orbit satellites.

Other **Catalogs** are accessed directly using the Autostar II "hot keys": Caldwell (key "2"), Messier catalog ("3"), Solar System ("5"), IC ("8"), and NGC ("9").

To slew the telescope to catalog objects:
Enter the catalog number of the object using the Number keys and then press ENTER. *For example*: To slew to NGC 6720, press Number Key "9," then using the Number keys, enter the digits "6-7-2-0." Then press ENTER.

Autostar II displays the common name and alternate names of the object, if available. Press one of the Scroll keys to display some or all of the following information about that object: Type of object (galaxy, nebula, etc.), Dec. and R.A. coordinates, constellation it is located within, magnitude, size, distance, and star-type classification, if the object is a star. If further information is available, it displays as scrolling text.

Press GO TO. The telescope, if aligned, will slew to that chosen object. Press MODE repeatedly to return to previous menu levels.

User Objects: Allows the user to define and store in memory deep-sky objects of specific interest that are not currently in the Autostar II libraries. See **CREATING USER OBJECTS**, page 42, for more information.

Identify: An exciting feature for an observer who wants to scan the night sky and start exploring. After the telescope has been properly aligned, use the Autostar II Arrow keys to move about in the sky. Then follow this procedure:

> ***Important Note:*** *Only use the Arrow keys to move the telescope during the Identify procedure. Do not loosen the telescope locks or move the base or alignment is lost.*

1. When a desired object is visible in the eyepiece, keep pressing MODE until the “Select Item: Object” menu is displayed. Press ENTER to select this menu.
2. Scroll through the Object menu options until the “Object: Identify” screen appears.
3. Press ENTER. Autostar II searches the libraries for the identity of the object being observed.
4. If the telescope is not directly on an Autostar II library object, the nearest library object is located and displayed on the screen. Press GO TO and the telescope slews to that object.

Looking at or near the **Sun** will cause **irreversible** damage to your eye. Do not point this telescope at or near the Sun. Do not look through the telescope as it is moving.

Browse: Allows you to search the library for objects with certain parameters, much like a search engine. "Edit Parameters" lets you set various parameters for the search, such as: Object Type, Minimum Elevation, Largest, *etc*. Once you have set the parameters of the search, select "Start Search" and press ENTER. Autostar II will display the results of the search.

Event Menu

The Event menu provides access to dates and times of astronomical events. The Event database includes:

Sunrise, Sun Transit, and **Sunset:** Calculate the time of Sun rise, Sun transit, or Sun set on the current date. Find rise and set times for other dates by entering a new date into the “Setup: Date” menu.

Moonrise, Moon Transit, and **Moonset:** Calculate the time of Moon rise, Moon transit, or Moon set on the current date. Find rise and set times for other dates by entering a new date into the “Setup: Date” menu.

Moon Phases: Displays the date and time of the next Full, New, 1st Quarter, and 3rd Quarter Moon.

Meteor Showers: Provides information on upcoming meteor showers, such as the Perseids, the Leonids, *etc.* Also lists the dates of the showers and when they reach maximum.

> ***Note:*** *Meteors are fast moving objects that cover large areas of the sky and are usually best observed with the naked eye.*

Solar Eclipse: Lists upcoming Solar Eclipses, including the date and type (total, annular, or partial) of eclipse. Use the Scroll Up and Down keys to display the available data. This option is dependent on your location.

Lunar Eclipse: Lists upcoming Lunar Eclipses, including the date and type (total, partial, penumbral) of eclipse. Use the Scroll Up and Down keys to display the available data.

Min. (Minimum) of Algol: Displays the minimum brightness of the dramatic eclipsing binary star system, Algol. It is relatively close at a distance of 100 light years. Every 2.8 days during a 10-hour period, Algol undergoes a major change in apparent magnitude as one of the two stars passes behind the other. The combined magnitude of the two stars thus dips from +2.1 to a minimum of +3.4 halfway through the eclipse as the second star is hidden. Autostar II calculates minimum magnitude time at mid-eclipse.

Autumn and **Vernal Equinox:** Calculate the time and date of the fall or spring equinox of the current year.

Winter and **Summer Solstice:** Calculate the time and date of the winter or summer solstice of the current year.

Glossary Menu

The Glossary menu provides an alphabetical listing of definitions and descriptions for common astronomical terms and Autostar II functions. Access directly through the Glossary menu or through hypertext words embedded in Autostar II. A *hypertext word* is any word in [**brackets**], usually found when using the Autostar II Help function or when reading a scrolling message such as a description of a planet or star. Press ENTER whenever a hypertext word is on screen and Autostar II goes to the glossary entry for that word.

To access directly from within the Glossary menu, use the Scroll keys to scroll through the alphabet. Press ENTER on the desired letter. Scroll to the desired entry and then press ENTER to read the description.

Utilities Menu

The Utilities menu provides access to several extra features within Autostar II, including a countdown timer and an alarm. The Utilities functions include:

Balance OTA: Use while you're balancing the OTA (see pages 22 - 23 for complete procedure). Allows to balance on both axes.

OTA Fan: Allows you to turn the fan off or on if you have an RCX model. The fan assists with the stabilization of the optics. The fan should be activated at the beginning of an observing session and run until the optics have achieved an equilibrium with the environment. Fan operation time should range from about 5 to 25 minutes. Note that the fan may introduce a slight vibration and this may cause noticeable movement observed with sensitive optics.

Dew Heater: Allows you to adjust heater level, setting from 0 to 100.

OTA Temperature: Provides a temperature reading at the edge of the corrector plate.

Ambient Temperature: Provides a temperature reading at the fork arm.

Timer: Selects a countdown timer. This feature is useful for functions such as astrophotography and tracking satellites. To use the Timer, press ENTER, then choose “Set” or “Start/Stop."

- **Set**: Enter the time to be counted down, in hours, minutes, and seconds, then press ENTER.
- **Start/Stop**: Activates the timer set previously. Use the Scroll keys to toggle between ON and OFF. When ON is displayed, press ENTER to activate the timer. When the timer runs out, four beeps sound and the timer is deactivated.

Alarm: Selects a time for an alarm signal to sound as a reminder. To use the Alarm, press ENTER, then choose "Set" or "Start/Stop."

- **Set**: Enter the time of day for the alarm to sound, in hours, minutes, and seconds, then press ENTER.
- **Start/Stop**: Activates the alarm set previously. Use the Scroll keys to toggle between ON and OFF. When ON is displayed, press ENTER to activate the alarm. When the alarm time arrives, Autostar II beeps. Press ENTER to deactivate the alarm.

Eyepiece Calc: Calculates information about an eyepiece for the specific telescope to which Autostar II is connected.

- **Field of View:** Scroll through a list of available eyepieces. When an eyepiece is selected, the field of view is calculated.
- **Magnification:** Scroll through a list of available eyepieces. When an eyepiece is selected, the magnification is calculated.
- **Suggest:** Autostar II calculates and suggests the best eyepiece for viewing, based on the telescope and the object being viewed.

Brightest Star: Gives you a choice of Autostar displaying "CTR Bright Star" or identifying the star by name during alignment.

Contrast Adj: Adjusts the contrast of the display using the Scroll keys. When complete, press ENTER.

Panel Light: Allows you to turn off LED panel light.

Aux Port Power: Allows you turn off and on the 12vDC OUT power port.

Beep: Turns the beep alerts on or off.

Temperature: Gives a temperature reading of the ambient air. This reading is not always available.

Sleep Scope: A power saving option that shuts down Autostar II and the telescope without forgetting its alignment. With "Sleep Scope" selected, press ENTER to activate the Sleep function. Autostar II goes dark, but the internal clock keeps running. Press any key, except ENTER, to re-activate Autostar II and the telescope.

Park Scope: Designed for a telescope that is not moved between observing sessions. Align the telescope one time, then use this function to park the telescope. The next time it is powered up, pressing ENTER causes the telescope to move to its predetermined Park position. Once parked, the screen prompts to turn off power.

Tip:
The Contrast Adjustment feature is usually only required in very cold weather.

If you adjust the contrast so that you can no longer read the display, turn off the power and turn it on again. When Version appears on the display (the initial display screens are not affected by the Contrast control), press MODE.

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Important Note: *When the "Park Scope" option is chosen and the display prompts you to turn off the telescope's power, Autostar II is unable to be returned to operation without turning the power off and then back on.*

Setup Menu

There are numerous other features available within the Setup menu, including:

Align: Let's you choose a method of alignment.

Align on Home: If Calibrate Home has been performed, power up your telescope and select this menu to return the previously calibrated home position. In other words, the telescope is fully aligned according to the setting that were stored in Autostar II's memory during the Calibrate Home procedure. See **CALIBRATE HOME**, below, for more information.

Telescope: Accesses several options, including:

- **Telescope Model:** Allows you to select the type of OTA mounted on Max.
- **Collimate:** Allows you use the Arrow keys to collimate the telescope. See pages 28 - 29 for more details.
- **Align OTA:** Allows you to align the OTA properly if you are not using an RCX model or if you have changed your RCX collimation or mounting significantly from the factory defaults. When you select this menu, Autostar will ask you to center two stars in the telescope that are on opposite sides of the sky.

  Once you have centered them, the telescope will slew back to the first star. You will then be asked to center the star using the OTA align bolt. These are two bolts, with one in the center of the other. Using a flat wrench, loosen the center bolt. Then place open ended or combination spanner wrenches on each bolt and turn them together. Turn them in the direction that centers the star. When centered, tighten just the center bolt. This will hold the bolts securely in that position.

- **Max Past Meridian**: Allows you to set how far the OTA axis can tilt past the meridian. 2° is the default setting.
- **Focal Length:** Displays the focal length of the selected telescope.
- **Max Slew Rate:** Sets the upper limit for the slew rate. 2.4° degrees per second is the fastest setting.
- **Park Position:** After aligning your telescope, select this menu and power down the telescope. The alignment settings—North, time, alignment stars—are stored in Autostar II's memory and are remembered after you power off the telescope. When you power on the telescope, "Automatic Alignment" displays after the start up routine. Press MODE (do not press ENTER). The telescope remembers its alignment and you can continue viewing or performing other operations without aligning the telescope again.

  Park Position provides two options. Use Current Position uses the last position set by the user. Default Position places scope in the home position.
- **Calibrate Home:** For permanently mounted telescopes only. After aligning your telescope, select this menu and the alignment settings—North, time, alignment stars—are stored in Autostar II's memory and are remembered after you power off the telescope. You can enable Autostar II to retrieve and automatically align your telescope using these settings the next time you power up by choosing the Align on Home menu. This menu helps improve auto alignment.
- **Anti-Backlash:** This option allows you to change the backlash along either the R.A. and the Dec. axes by entering a number from 0% to 199%. This sets the backlash in the way the Arrow keys move the telescope along an axis. If you enter a value near 199%, telescope responds more quickly as you hold down an Arrow key. If you enter a value near 0%, it takes longer for the tube to respond as you hold down an Arrow key. Experiment with this option: Try changing the values until the motion of the telescope (while holding down an Arrow key) feels comfortable to you.

- **Train Drive**: All telescopes have a certain amount of "backlash" (looseness in the interplay of gears). This menu allows you to compensate for the backlash in the the R.A. and Dec motors—which helps locate objects with more precision.
- **Tracking Rate:** Changes the speed at which the telescope tracks targets in the sky.
    a. **Sidereal:** The default setting for Autostar II; sidereal rate is the standard rate at which stars move from East to West across the sky due to the rotation of the Earth.
    b. **Lunar:** Choose this option to properly track the Moon over long observing sessions.
    c. **Solar:** Choose this option when observing the Sun.
    c. **Custom**: Allows entry of user-defined tracking rates.

    Note: Custom Tracking Rate *allows you to enter values from -999.999 to 999.999. The lower the number, the slower the rate; the higher the number the faster the rate. If you enter -999, the telescope will move so slow as to appear to be stopped. If you enter 999, the telescope will be moving at approximately twice the tracking rate.*

- **Guiding Rate:** Allows you to change the base slew speed, 1x. Enter a percentage of the speed (less than 100%) and press ENTER. This function may be useful in guiding the telescope during CCD and long-exposure photography. See **SLEW SPEEDS**, page 26, for more information.
- **Dec Guiding:** Allows a user using an autoguider to disengage autoguider inputs. Allows you to select N & S, North only, South only, and off.
- **Reverse L/R:** Reverses the functions of the Left and Right Arrow keys for controlling the telescope's motion (*i.e.*, the Right key moves the telescope to the left*).*
- **Reverse U/D:** Reverses the functions of the Up and Down Arrow keys for controlling the telescope's motion (*i.e.*, the Up key moves the telescope down*).*
- **Home Sensor:** Turns off or on the True North sensor, if preferred, for Easy, One-Star, and Two-Star alignment. The default setting for this menu is "On."
- **GPS Alignment:** Allows three options. Select "Off" if you wish to align the telescope manually (turns off GPS). Select "On" (default setting) if you wish to automatically align your telescope and want the telescope to get the GPS fix when it is needed during alignment. Select "At Start Up" if you want the telescope to get a GPS fix when the telescope is powered up.
- **R.A. PEC:** Allows you to perform periodic error correction on the R.A. drive worm gear. Must be performed with a high-power reticle (*eg.,* 9mm). You may restore the factory default setting by selecting “On.”
- **High Precision:** If High Precision is turned on, when looking for a faint celestial object (*e.g.*, a nebula or galaxy), Autostar II first slews to a nearby bright star and displays "ENTER to Sync." Center the star in the eyepiece, then press ENTER. At that point the telescope has a high precision alignment to that part of the sky and it then slews to the object that was originally requested.

Time: Changes the time entered into Autostar II. Setting the correct time is critical for Autostar II to properly calculate locations and events. Time may be set to "AM," "PM," or 24-hour mode (military time). To select the 24-hour mode, press ENTER when the the "blank" option displays (*i.e.*, neither "AM" nor "PM" is displayed).

Tip:
If the "ENTER to Sync" feature is accessed by mistake (holding the ENTER key for more than 2 seconds), press MODE to return to the previous screen.

Targets: Switches between Astronomical targets and Terrestrial targets. If "Astronomical" is selected, the telescope tracking motor is activated and any object you observe in the sky will remain centered in the eyepiece. If "Terrestrial" is selected, the tracking motor is turned off.

Date: Changes the date used by Autostar II. This function is useful to check events in the past or future. *For example*: Set the Date menu for a day three months in the future. Then check the "Select Item: Event" menu for the Sunset time on that date. See **EVENT MENU**, page 35.

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Daylight Saving: Enables or disables the Daylight Savings time setting.

***Note**: Daylight Savings Time may be referred to by different names in various areas of the world. Check local time to verify.*

Smart Mount: See page 55 for detailed information.

GPS-UTC Offset: Universal Time (UTC) allows you to add leap seconds to its time calculations, GPS does not. The offset is the number of leap seconds added since the establishment of GPS.

Site: Site provides access to several options including:

- **Select**: Displays the currently selected observing site. Use the Scroll keys to cycle through all available sites (see **ADD** below). Press ENTER when the site you wish to select displays. Use this option when you move to a different geographic location.
- **Add**: Allows you to add new observing sites to the database. Scroll through the list of Countries/States. Press ENTER when the site you wish to add displays. Then choose the desired city in the same manner.

  However, when the GPS signal is received, the site is normally selected automatically and the site list is updated automatically. Use of this option is not necessary and is included for the convenience of those users who may wish to enter a site manually. You may edit the name of a site using the Edit option (see below).
- **Delete**: Deletes a stored site from the database.
- **Edit**: Edits a selected site, including: the name, latitude, longitude, and time zone. Time Zone refers to the Greenwich Mean Time (GMT) time zone shift. Users West of Greenwich, England use "-" hours, East of Greenwich use "+" hours. For the United States, look up the time zone shift in **Table 1**.

  ***Note:** Autostar II compensates for daylight savings time, if selected. See **SETUP MENU: DAYLIGHT SAVING**, above.*

Time Zone	Shift
Atlantic	-4 Hours
Eastern	-5 Hours
Central	-6 Hours
Mountain	-7 Hours
Pacific	-8 Hours
Alaska	-9 Hours
Hawaii	-10 Hours

***Table 1:** Time Zone Shift. Calculations are for standard time.*

Owner Info: Accesses the owner information menu, including:

- **Name**: Users may enter both their first and last names using the Up and Down Arrow keys to cycle through the alphabet. Use the Right and Left Arrow keys to move through the text. Press ENTER when the entry is complete.
- **Address**: Use the Up and Down Arrow keys to enter your street address, city, state, and zip code. Press ENTER when the entry is complete.

Clone: Uploads information from one Autostar II handbox to another. Three options are available:

- **Catalogs:** Sends only user-defined object information, such as new satellite orbits or comet data to another Autostar II handbox.
- **Software:** Sends only the basic Autostar II software. This is useful if one user has downloaded a new version of Autostar II software from the Meade website (**www.meade.com**) and wants to pass this software along to friends.
- **All:** Everything—user-defined information and Autostar II software—is sent to another Autostar II.

Note:
The Download function requires the USB cable supplied with the RCX telescope. See page 49 for more information on how to download.

Important Note:
If your download fails in the middle of the download attempt (e.g., your PC crashes), turn off the telescope. Turn the telescope back on and as soon the Autostar II display lights up, press "999." Then attempt the download again.

Download: Transfers information from another Autostar II. During the operation, the warning "Downloading Do Not Turn Off" appears.

- **Catalogs:** Receives only user-defined object information, such as new satellite orbits or comet data to another Autostar II handbox.
- **Software:** Receives only the basic Autostar II software. This is useful if one user has downloaded a new version of Autostar II software from the Meade website (**www.meade.com**) and wants to pass this software along to friends.
- **All:** Everything—user-defined information and Autostar II software—is received by another Autostar II handbox.

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Statistics: Provides basic statistical data about Autostar II, including:

- **Characters Free**: Displays how much room is available in user-defined object memory.
- **Version**: Displays the current version of the Autostar II software.
- **Serial Number**: Displays the unit's serial number.

Reset: Completely resets Autostar II. Most values entered into the menus revert to factory defaults. Autostar II requires initialization again after a Reset before proceeding with observations.

"Hot Button" Menus

Two menus, six object libraries and two functions can be accessed directly using the Number keys (commonly referred to as "hot buttons"). The two functions, the Speed mode and the Utility light are described earlier in the manual.

Focus Control Menus: Press Number key "4" to select these menus directly from Autostar II's keypad. Each time you press Focus, the key toggles between focus/focus speed menus and the preset control menus. When “Focuser: Fast” displays, press the Up or Down Scroll keys to select a focus speed (fast, medium, slow or fine). When “Focuser: Position” displays, use the Up or Down Arrow keys to achieve fine focus of the object.

You can toggle the Focus key to display the “Focuser: Preset” menus. The Focuser preset menu allows you to assign nine focus positions. If you “park” the telescope, you can set your own focus, focus for your observing partners and the focus for your camera or imager. Other Preset menus allow you to select a focus you have assigned and also to Sync on a Focus Preset. The Sync on a Focus Preset allows you retrieve focus positions when you **do not park** your telescope. See page 37 for information about parking your telescope.

Reticle Control Menu: Press Number key "7" to select this menu directly from Autostar II's keypad. "Reticle Control: Set Intensity" displays. Press ENTER. The Intensity menu allows you to change the intensity of the Reticle Eyepiece Illuminator. Use the Scroll keys to change the value. As you change the value, look through the reticle to note how the Intensity changes.

> ***Note**: You may continue to change the values using the Scroll keys (and thus changing the intensity) until you press ENTER again. This allows you to experiment with the intensity level until you decide which intensity level works best for you. This feature operates in the same manner in the Rate and Duty Cycle menus.*

When you have finished adjusting the intensity, press ENTER. Press Number key "7" again and the Rate menu displays. Press ENTER again. Use the Scroll keys to change the value of the the rate at which the Reticle Eyepiece blinks. As you change the value, look through the reticle to note how the Blink Rate changes.

When you have finished adjusting the rate, press ENTER. Next, Press Number key "7" again and the Duty Cycle menu displays. Press ENTER again. The Duty Cycle menu controls how long the Reticle Eyepiece Illuminator is on during a blink cycle. Use the Scroll keys to change the value. As you change the value, look through the reticle to note how the Duty Cycle changes. When you have decided on a Duty Cycle value, press ENTER.

To exit the Reticle menu, press MODE once.

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ADVANCED AUTOSTAR II FEATURES

Before trying out the examples in this section, familiarize yourself with the basic operations of Autostar II described earlier in this manual. The following examples assume that you have a basic knowledge of Autostar II and understand how to scroll to a desired menu or menu option, and how to enter numbers and text. It also assumes that you have initialized and aligned your telescope.

Adding Observing Sites

If you plan to observe using Autostar II at different geographic locations, you can store observation sites in Autostar II's memory to help simplify your telescope setup. Perform these procedures using the Site options (Add, Select, Delete, Edit) of the Setup menu.

Important Note:
The Site information is stored in the Site menu. If you move the telescope more than 5 miles of your initial observing location, Autostar II automatically determines your location when it gets a GPS Fix, and adds the new location to the Site menu.

To Add a Site to the user-defined site list:

In this example, you will choose a city and add it to the database list. You will then select the site to enable it.

1. Navigate to the "Setup: Site" menu. Press ENTER,
2. Scroll through the options until "Site: Add" displays. Press ENTER.
3. Scroll through the list of countries/states. Press ENTER when the country/state you wish to add displays.
4. Scroll through the list of cities. Press ENTER when the city you wish to add displays. The Site is now added to the database. You may add sites using this method.
5. To choose a site, navigate to "Setup: Select." Press ENTER. Scroll through the list of sites. When the desired site displays, press ENTER.

To Edit a Site:

In this procedure, you will enter a location that is not available in the Autostar II database by editing data of a nearby site. You will edit the location's name, latitude, longitude, and the time zone shift. You will then select the site to enable it.

You will need to know the latitude and longitude of your location to perform this procedure.

1. Using the Add option, choose a site on the list that is closest to your observing site and press ENTER so that the site is added to your observing sites list. Choosing a site already on the list (as opposed to using the "Custom" feature) makes it easier to edit, as the "Time Zone" value may not need to be changed.
2. Scroll to "Site: Edit" and press ENTER. "Edit: Name" displays. Press ENTER.
3. The name of the site you have just entered to your list displays; if it does not, scroll to the site.
4. Using the Arrow keys, change the name of the site so that it now reads the name of your observing location. Press ENTER. "Edit: Name" displays again.
5. Press the Scroll Down key and "Edit: Latitude" displays. Press ENTER.
6. Using the Number Keys, enter the latitude of your observing site and then press ENTER. "Edit: Latitude" displays again.
7. Press the Scroll Down key and "Edit: Longitude" displays. Press ENTER.
8. Using the Number Keys, enter the longitude of your observing site and then press ENTER. "Edit: Longitude" displays again.
9. Press the Scroll Down key and "Edit: Time Zone" displays. Press ENTER. (If the site you chose from the list in step 1 has the same Time Zone as the site you are editing, just press ENTER again to go on to the next step.) "Time Zone" refers to the Greenwich Time Zone shift. Users West of Greenwich, use "-" hours (one hour per time zone) and users East of Greenwich use "+" hours. For the United States, look up the shift in **TABLE 1,** page 39.
10. After entering the shift, press ENTER. "Edit Time Zone" displays.

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11. Press MODE. "Site: Edit" displays.
12. Using the Arrow keys, scroll to "Site: Select." The site you have just edited displays. Press ENTER to select the site.

Creating User Objects

In this procedure, you will enter coordinates of celestial objects that do not appear in any of the Autostar II libraries. You will enter the object's name and R.A. and Dec. coordinates (required information). You may also enter the object's magnitude and size (optional information).

Although Autostar II contains an extensive database of celestial objects (stars, nebulae, planets, etc.) that you can observe, you may eventually want to view objects that are not part of a library. Autostar II provides a feature that allows you to enter an object's R.A and Dec. coordinates in the "User: Objects" option of the Object menu and allows automatic slewing of the telescope to the user-entered coordinates.

In order to use this menu option, you first need to look up the R.A and Dec. coordinates of the object or objects you wish to observe. Check your local library, computer store, or bookstore for astronomy books, CD Roms, or magazines (such as *Sky & Telescope* or *Astronomy),* to find coordinates of celestial objects. The objects/coordinates you enter become part of your own permanent database, called "User Objects."

To enter coordinates of an object into the "User: Objects" option of the Object menu:

1. Make sure Autostar II has been initialized and the telescope has been aligned.
2. After the telescope is aligned, "Select Item: Object" displays. (If necessary, use the Scroll keys to scroll through the menus, as previously described, to find this option.) Press ENTER.
3. "Object: Solar System" displays. Keep pressing the Scroll Up key until "Object: User Object" displays and press ENTER.
4. "User Object: Select" displays. Press the Scroll Down key once. "User Object: Add" displays. Press ENTER.
5. "Name" displays on the top line and a blinking cursor on the second line. Use the Arrow keys, as previously described, to enter the name of the object you wish to add to the database. When you are finished, press ENTER.
6. "Right Asc.: 00.00.0" displays. Use the Number keys to enter the digits for the Right Ascension coordinate of your object. When you are finished, press ENTER.
7. "Declination: +00°.00'" displays. Use the Number keys to enter the digits for the Declination coordinate of your object. If necessary, use the Scroll Keys to change "+" to "-." When you are finished, press ENTER.
8. Autostar II then prompts you to enter the size of the object. This step is optional. Use the Number keys to enter the size (in arc-minutes), if so desired, and press ENTER to go to the next display. If you do not wish to enter this information, simply press ENTER.
9. Autostar II then prompts you to enter the magnitude of the object. This step is also optional. Use the Number keys to enter this information, if so desired, and press ENTER to go to the next display. "User Object: Add" displays again.

To GO TO a user-entered object:

In this procedure, you will choose an object from the User Object list and GO TO the object.

1. With "User Object: Add" displayed, press the Scroll Up key once. "User Object: Select" displays. Press ENTER.
2. Use the Scroll keys (if necessary) to scroll to the desired object. Press ENTER.
3. The name of the object and the Right Ascension and Declination coordinates display.
4. Press GO TO and the telescope slews to the object.

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Observing Satellites

In this procedure, you will prepare your telescope to observe a satellite pass.

1. Navigate to the "Object: Satellite" menu option and press ENTER.
2. Use the Scroll keys to scroll through the list of satellites.
3. Select a satellite from the list and press ENTER.
4. "Calculating...." and then "Tracking..." displays. If the satellite is going to make a pass, "Located" displays.
5. Use the Scroll keys to display data about the pass: aos—acquisition of signal and los—loss of signal. If you subtract the aos from the los, you can calculate how long the satellite will be visible. Location information also displays.
6. "Alarm" displays after the location information. Press ENTER and Autostar II automatically sets the alarm to sound a minute before the satellite's scheduled appearance. You may return to regular observations until the alarm goes off.
7. When the alarm goes off, return to the Satellite menu and press a Scroll key until the desired satellite is on the top line of the display.
8. Press GO TO. Autostar II slews the telescope to where the satellite should appear. The motor drive stops and a countdown is displayed.

   NOTE: *If the scheduled appearance position of the satellite is obstructed (i.e., by a building, tree, or hill), press ENTER and Autostar II starts to move the telescope along the expected satellite track. When the track clears the obstruction, press ENTER again to pause the telescope, then continue with this procedure.*

9. With about 20 seconds left on the countdown timer, start watching through the telescope viewfinder for the satellite to enter the field of view.
10. When the satellite enters the viewfinder field of view, press ENTER. The telescope starts to track with the satellite.
11. Use the Autostar II Arrow keys to center the object in the viewfinder, then look through the eyepiece to view the object.

Satellite orbits change and new satellites (including the Space Shuttle) are launched. Visit the Meade website (**www.meade.com**) approximately once a month to get updated information and instructions on how to download this data to Autostar II. If orbital parameters are more than one month old, the satellite pass may not happen at the time predicted by Autostar II. Downloading requires the USB cable supplied with your telescope.

> ***Note:*** *Satellite observing is an exciting challenge. Most satellites are in low orbit, travelling at approximately 17,500 mph. When visible, they move quickly across the sky and are only in the field of view for a few minutes, requiring Autostar II to slew the telescope rapidly. Best viewing is near Sunrise or Sunset when the sky is still dark. Viewing in the middle of the night can be problematic because a satellite may pass overhead, but not be visible as it is in the Earth's shadow.*

Identify

This procedure allows you to use Autostar II to identify objects you have found in the night sky using the Arrow keys. If the object is not in Autostar II's database, Autostar II displays information about an object in its database that is closest to the one you queried about.

> ***Important Note:*** *For this function to operate properly, you must first initialize and align Autostar II. If you physically move the telescope after initialization, this function will fail to operate properly.*

In this procedure, you will center an object you wish to have identified by Autostar II in the telescope eyepiece and use the "Identify" menu to find out information about the object or the nearest object to it in the Autostar II database.

1. Center the object you wish to have identified in the telescope's eyepiece.

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2. Navigate to the "Object: Identify" option and press ENTER.
3. "Searching..." displays. When Autostar II finishes calculating, the name of the closest object displays.
4. Press a Scroll key to display information about this object. Autostar II displays some or all of the following information about the object with each press of a Scroll key:

Displayed information:	**Example:**
Catalog or common name of object	Messier 107, NGC6171, Orion Nebula, etc
Type of object	Globular Cluster, Nebula, Black Hole, etc.
Right Ascension	16:32:4
Declination	13°03'
Constellation	Virgo, Orion, etc.
Magnitude	3
Size	2'
Scrolling message	"This Globular Cluster is 10,000 light years away...."

Browse

This menu allows you to search the libraries for objects with certain parameters, much like a search engine. "Edit Parameters" lets you set various parameters for the search, and "Start Search" activates the search. A typical search might be performed as follows:

1. Select "Browse" from the Object menu. Press ENTER. "Browse: Start Search" displays.
2. Press one of the Scroll Keys and "Browse: Edit Parameters" displays. Press ENTER.
3. "Edit Parameters: Largest (mins)" displays. "Mins" stands for arc-minutes. Press ENTER.
4. "Largest (mins)" and a value displays. Using the Number keys, enter a size in arc-minutes. Autostar II will search for objects *up to* this size and no larger. Press ENTER.
5. "Edit Parameters: Largest (mins)" displays again. Press the Scroll Down key. "Edit Parameters: Smallest (mins)" displays. Enter the value for the smallest size of an object that Autostar II will search for in the database. Continue with "Brightest," Faintest," and "Minimum Elevation," using the procedure described in steps 3 and 4.
6. After "Minimum Elevation," "Object Type" displays. Press ENTER." "+Black Hole" displays. If you do *not* wish to have "Black Holes" in your search, press ENTER and the "+" changes to a "–." Press the Scroll Down key to scroll to the next item. "+Diffuse Nebula" displays. Continue to scroll through the list and press ENTER if you wish to change the "+" to a "–" or vice-versa.
7. After you have scrolled to the last item on the "Object Type" list, press MODE twice and the Scroll Down key once. "Browse: Start Search" displays. Press ENTER. "Start Search: Next" displays. Press ENTER. Autostar II searches the database and displays the first object that matches the search parameters you have entered. Use the scroll keys to display information about the object. Press MODE and "Start Search: Next" displays again. Press ENTER and the next item matching the parameters displays. Repeat this procedure to display all the objects. Press GO TO to slew telescope to a displayed object.
8. Press MODE repeatedly to leave this menu.

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Alternate Polar Alignments

If you would rather set up your telescope without using automatic alignment, Autostar II offers alternative alignment methods for equatorial mounting. During the One-Star and Two-Star alt/az alignment procedures, you will (unlike the Automatic and Easy alignment procedures) manually place the telescope in the home position.

Initialize Autostar II

First, you need to initialize Autostar II.

1. Connect Autostar II to the HBX port of the RA Control Panel (or Dec Control Panel).
2. Flip the power switch of the RA Control Panel to the ON position.

   The Autostar II screen is activated and a copyright message displays briefly.
3. "Press 0 to Align or Mode for Menu" displays. Press 0.
4. The telescope will seek the home position. Autostar II initializes the Smart Drive. The R.A. and Dec. motors operate briefly and "Initializing: Smart Drive" displays.
5. "Automatic Alignment" displays.

You are now ready to align your telescope using one of the alternate polar alignment procedures.

Important Note:
If you disable the automatic alignment/GPS function and then use the alternate alignments described in this section, you will be prompted to enter the Time, Date, and Daylight Savings status.

Two-Star Polar Alignment

Two-Star Alignment requires some knowledge of the night sky. Autostar II provides a library of bright stars and two stars from this library are chosen by the observer for alignment.

1. **Alignment Option Screen**. "Align: Automatic" displays.
2. **Select Alignment**. Press the Scroll keys until "Align: Two Star" displays. Press ENTER.
3. **Set Home Position**. Place the telescope in the home position.
4. **Star Alignment**. "Select Star" displays. Autostar II then displays a library of stars for the observer to choose from. Use the Scroll keys to scroll to a star on the list that you wish to align upon. Select a star that you can easily locate in the night sky. Press ENTER.
5. **Center Star.** The telescope slews to the star. Use the Arrow keys to move the telescope until the star is centered in the eyepiece. Press ENTER.
6. **Center Star.** Repeat procedure for the second alignment star. The telescope is aligned and you are now ready to use Autostar II's GO TO capabilities for a night of observing.

Note:
Autostar II locates alignment stars based on the date, time, and location entered. The alignment stars may change from night to night. All that is required is for the observer to center the selected stars in the eyepiece when prompted.

Easy Polar Alignment

Easy Alignment is similar to Two-Star Polar Alignment, except it requires no knowledge of the night sky. Autostar II, rather than the user, chooses two stars its library and merely asks the user to center them in the eyepiece.

One-Star Polar Alignment

One-Star Alignment requires some knowledge of the night sky. Autostar II provides a library of bright stars. One-Star Alignment is identical to Two-Star Polar: Alignment, except only one star from the database is chosen by the observer for alignment.

Align on Home

Allows recovery of alignment. Selecting this alignment slews telescope to sensor home position. It then performs an automatic alignment on the telescope based on a GPS fix and the home position sensor.

Tip:
Try a Spiral Search
The GO TO key also allows you to perform a "spiral search." A spiral search is useful when the telescope slews to an object, but that object is not visible in the eyepiece after the telescope finishes its search. (This sometimes occurs during an alignment procedure.) Press GO TO when the slew is finished and the telescope starts slewing in a spiral pattern at a very slow speed around the search area. Look through the eyepiece and when the object does become visible, press MODE to stop the spiral search. Then use the Arrow keys to center the object.

To Download the Latest Version of Autostar II Software

Included with your telescope is a CD ROM and a USB cable. You need to install the USB drivers, that are included on the CD ROM, **BEFORE plugging in the cable**:

1 Select RCX Users (the fourth selection on the list) from the CD Rom.

2 Follow on screen instructions (click “Next” and “Finish” buttons when asked to do so).

3 Plug in the USB cable. Plug one end into one of the RCX400 USB ports on a

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computer control panel/ Plug the other end into a USB port of your PC Next, you will install the Autostar Suite software from the CD ROM. This software provides a menu that allows you to download the latest version of Autostar II software into the Autostar II handbox.

4. Select Autostar Suite on the CD ROM to install Autostar Suite onto your PC. Follow the on-screen instructions.
5. Once the Autostar Suite software installs, double-click the new “Autostar Suite” icon on the desktop.
6. Go to the Telescope menu and select “Update Autostar.” The “Autostar Update” screen displays. Click the “Upgrade Autostar Software Now” button.
7. The application detects your telescope type and the version of Autostar software on your handbox.
8. A window displays asking if you wish to download the latest version of Autostar from your hard drive (if you previously downloaded it separately from the Meade website) or from the internet. Select one of the choices and follow on-screen instructions.
9. The download will take several minutes (download time depends on your internet connection, speed of your computer and so forth). When the download is complete, the new version of the Autostar software displays.

Periodic Error Correction

If you wish to perform high-precision astrophotography, you may wish to "train" your telescope in order to keep objects that you are imaging dead center in the telescope's field of view during the photographic exposure. Periodic error correction (PEC) helps to remove the slight perturbations from center that occur due to the mechanical nature of a telescope. To perform this procedure, you need to use a high-power reticle, such as the 9mm reticle (see **OPTIONAL ACCESSORIES**, pages 48 - 50). PEC training is available for both drives.

Train Menu Option

Important Note: *The Train option overwrites any previous PEC data.*

1. Select "Train" from the RA PEC menu (in the "Setup: Telescope" menu) and press ENTER.
2. Look through the reticle. Use the Arrow keys to keep the star centered in the reticle cross-hairs. Autostar II displays a count of the 75 positions of the worm gear. When the count reaches 75, one cycle is complete. A full cycle takes about 20 minutes.
3. Select "Train" from the R.A. PEC menu (in the "Setup: Telescope" menu) and press ENTER.
4. Press MODE to exit.

Update Menu Option

Use the Update option to further refine your training; it is recommended that you update your original training two or three times when first using your telescope. Update does not overwrite the data, but updates the training using information gathered from both the last and the current training sessions. Press the MODE key to exit from this option. If you wish to further refine your training, select this menu again and repeat the procedure.

Erase Menu Option

Select this option to erase all PEC training data.

On and Off Menu Options

Select "On" when you want the telescope to use the training information. Select "Off" when you do not want for the telescope to use the training information. Select "On" to enable the Smart Drive.

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OPTIONAL ACCESSORIES

A wide assortment of professional Meade accessories is available for the RCX400 telescope models. The premium quality of these accessories is well-suited to the quality of the instrument itself. **Consult the Meade General Catalog for complete details on these and other accessories.**

Fig. 46: *Series 5000 5 Element Plossl Eyepieces.*

Fig. 47: *Series 5000 Super Wide Angle Eyepieces.*

Fig. 48: *Series 5000 Ultra Wide Angle Eyepieces.*

Fig. 49: *Series 5000 TELEXTENDERS.*

Meade Series 4000 Eyepieces:

Eyepiece	16" f/8 Power/Actual Field	20" f/8 Power/Actual Field
Plössl Eyepieces (5 elements; 1.25" O.D., except as noted)		
5.5mm (6-elements)	591/0.10°	739/0.08°
9 mm	361/0.17°	452/0.13°
14mm	232/0.26°	290/0.21°
20mm	63/0.37°	203/0.30°
26mm	125/0.48°	156/0.38°
32mm (2" O.D.)	102/0.59°	127/0.47°
40mm (2" O.D.)	81/0.74°	102/0.59°
Super Wide Angle Eyepieces (6-elements; 1.25" O.D., except as noted)		
16mm	203/0.33°	254/0.27°
20mm	163/0.42°	203/0.33°
24mm	135/0.50°	169/0.40°
28mm	116/0.41°	145/0.47°
34mm (2" O.D.)	96/0.59°	120/0.57°
40mm (2" O.D.)	81/0.74°	102/0.67°
Ultra Wide Angle Eyepieces (8-elements; 1.25" O.D., except as noted)		
4.7mm	691/0.12°	865/0.09°
6.7mm	485/0.17°	607/0.14°
8.8mm	369/0.22°	462/0.18°
14mm	232/0.35°	290/0.28°
18mm	181/0.45°	226/0.36°
24mm (2" O.D.)	135/0.60°	169/0.49°
30mm (2" O.D.)	108/0.76°	135/0.61°

Series 5000 TeleXtenders: An advanced 4-element design flattens the field of view, and the fully coated lenses deliver the maximum light transmission, the highest contrast and an image free of color fringing. Maintains a comfortable eye relief of longer focal length eyepieces, while increasing magnification.

Magnification	Barrel Size	# of elements
2x	1.25"	4
3x	1.25	4
5x	1.25	4
2x	2.00 (w/1.25" adapter)	4

Series 4000 8 - 24mm Zoom Eyepiece: The internal zoom optics of this eyepiece move on smooth, precisely machined surfaces which maintain optical collimation at all zoom settings. A scale graduated in 1mm units indicates the zoom focal length in operation. An excellent addition to any eyepiece set.

Series 4000 Photo-Visual Color Filters: Color filters significantly enhance visual and photographic image contrast of the Moon and planets. Each filter threads into the barrel of any Meade 1.25" eyepiece, and into the barrels of virtually all other eyepiece brands as well. Meade filters are available in 12 colors for lunar and planetary applications, and in Neutral Density as a lunar glare-reduction filter.

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Fig. 50: *Series 4000 8 - 24mm Zoom Eyepiece.*

Fig. 51: *#905 Variable Polarizer and #1A Skylight Filter.*

Fig. 52: *Illuminated Reticle Eyepiece.*

Fig. 53: *#62 T-Adapter.*

Series 4000 Nebular Filters: A modern boon to the city-dwelling deep-space observer, the interference nebular filter effectively cancels out the effects of most urban light pollution, while leaving the light of deep-space nebular emissions virtually unattenuated. Meade **Series 4000 Nebular Filters** utilize the very latest in coating technology, and are available with threaded cells for eyepieces or for attachment to the rear cells of Meade Schmidt-Cassegrain models.

Variable Tele-Extender: For eyepiece-projection photography of the Moon and the planets, a Tele-Extender is required. The **Variable Tele-Extender** threads onto the telescope's eyepiece-holder, into which is inserted an eyepiece of typically about 26mm focal length; the 35mm camera body couples to the tele-extender by means of a T-Mount. The Meade **Variable Tele-Extender** permits a range of projection images.

#928 45° Erect-Image Diagonal Prism: Diagonal mirrors and prisms result in images that are correctly oriented up-and-down but reversed left-for-right. For terrestrial observing a fully correctly oriented telescopic image is desirable; the **#928 Diagonal Prism** accomplishes this image correction and places the eyepiece at a convenient 45° viewing angle. The #928 is for use with the 1.25" Eyepiece-Holder.

Series 4000 Plössl 9mm Illuminated Reticle Eyepiece: The most advanced commercially-available illuminated reticle eyepiece, the **Series 4000 Plössl 9mm** model, powered by an internal battery, includes micrometric x-y positioning controls which greatly facilitate locking onto the guide star: Turn the finely-threaded controls and place the reticle's crossline pattern precisely at the desired position in the field. The sharp, high-power imaging of the 4-element, multi-coated Plössl optical system is complemented by a rubber eyecup (foldable for eyeglass wearers) that shuts out distracting stray light from the observer's eye. The upper (lens) section of the eyepiece rotates on a fine thread for precise diopter adjustment to the user's eye. Reticle pattern is a double crossline with two concentric circles.

#62 T-Adapter: The T-Adapter is the basic means of prime-focus photography through all Meade Schmidt-Cassegrain models. Thread the T-Adapter on to the rear cell of your telescope, followed by a T-Mount for your 35mm camera, and the camera body is rigidly coupled to the telescope.

#777 Off-Axis Guider: The Off-Axis Guider provides a means during long-exposure astrophotography for the photographer to monitor the tracking of the telescope to assure that the telescope remains precisely positioned on the object being photographed. Like the T-Adapter, the **Off-Axis Guider** couples the camera body to the telescope but it also causes a small amount of the guidestar's incoming light to be diverted at a right angle, where the star's position can be examined for tracking errors with an illuminated reticle eyepiece; position corrections can then be effected using Autostar II.

Piggyback Brackets (not available for 20" model): Piggyback photography is one of the most popular and easiest ways to get started in astrophotography. Attach your 35mm camera, with its own 35mm-to-250mm lens, atop your RCX400 in equatorial mode, and guiding the camera through the main telescope, wide-field photos of the Milky Way of remarkable detail and clarity can be taken.

Dew Shields (not available for 20" model): In moist climates, water particles suspended in the atmosphere may condense on the front surface of the telescope's correcting plate. This dew formation may be inhibited to a significant extent by the addition of a dew shield, essentially an extension tube attaching to the front-cell of the telescope.

#905 Variable Polarizer (1.25"): #1A Skylight Filter: The #905 system includes 2 Polarizer filters mounted in a specially-machined cell, for glare-reduction in observing the Moon. Rotate the thumbscrew at the side of the unit to achieve light transmission between 5% and 25% of its original value. The #905 inserts into the diagonal mirror of the telescope, followed by an eyepiece. The #1A Skylight Filter threads onto the rear cells of all Meade RCX models and effectively seals the interior of the telescope from dust. All other rear cell accessories may then be threaded to the #1A

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filter. The filter increases visual and photographic contrast, decreases glare, and helps to penetrate haze.

RCX AC Wall Adapter: Permits powering from a standard home (115v AC) outlet.

Cigarette Lighter Adapter: Powering the RCX400 telescope by means of an automobile cigarette lighter plug.

#644 Flip Mirror System: Has an X/Y adjustment mechanism for the diagonal mirror with locks for the precise centering, and multiple rotating adapters for T-thread and 1.25" camera attachment. Accepts 1.25" O.D. eyepieces and has a clear aperture of 22mm. Use with small to medium size chip CCD cameras.

#647 Flip Mirror System: Has an X/Y adjustment mechanism for the diagonal mirror with locks for the precise centering, and multiple rotating adapters for T-thread and 1.25" camera attachment. Accepts 1.25" O.D. and 2.00" eyepieces and has a clear aperture of 40mm. Use with medium to large size chip CCD cameras. **CCD Framing Ocular:** Displays rectangular frame of all popular CCD chip sizes. Inserts directly into the eyepiece holder or flip mirror. Includes variable LED illumination control and batteries.

Astrometric Eyepiece: A high-precision 3-element achromatic eyepiece for a wide range of astronomical measurements. Measure double star separations, position angles, planetary diameters, lunar crater diameters and so forth. Includes variable LED illumination control and batteries.

Deep Sky Imager: The Deep Sky Imager combines the power of an electronic astronomical imager with the simplicity of a web cam, allowing you to capture deep sky images on your PC.

Low Latitude Counterweight Kit: This optional feature is necessary if you wish to use the mount if your site is 0° to 30° away from the equator. Contact your Meade dealer for more information.

Mounting Plate: This optional feature allows you to mount non-RCX models to Max. Contact your Meade dealer for more information.

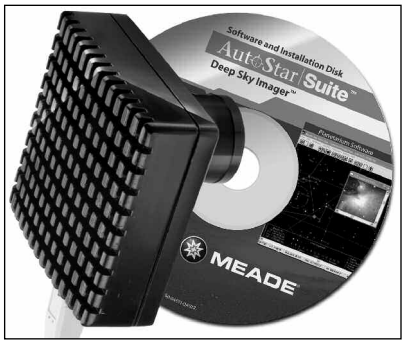

Fig. 54: *The Deep Sky Imager.*

More accessories will soon be available for your RCX400 model. To find out more about these and other accessories available for your telescope, check out the new Meade General Catalog or contact your local Meade dealer. Also check out Meade's latest ads in Sky and Telescope and Astronomy magazine.

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MAINTENANCE

RCX400 telescopes are precision optical instruments designed to yield a lifetime of rewarding applications. Given the care and respect due any precision instrument, your RCX400 will rarely, if ever, require factory servicing. Maintenance guidelines include:

a. Avoid cleaning the telescope's optics: A little dust on the front surface of the telescope's correcting lens causes virtually no degradation of image quality and should not be considered reason to clean the lens.

b. When absolutely necessary, dust on the front lens should be removed with gentle strokes of a camel hair brush or blown off with an ear syringe (available at any pharmacy). DO NOT use a commercial photographic lens cleaner.

c. Organic materials (e.g., fingerprints) on the front lens may be removed with a solution of 3 parts distilled water to 1 part isopropyl alcohol. You may also add 1 drop of biodegradable dishwashing soap per pint of solution. Use soft, white facial tissues and make short, gentle strokes. Change tissues often.

   ***Caution**: Do not use scented or lotioned tissues or damage could result to the optics.*

d. Do not, for any reason, remove the correcting plate from its machined housing for cleaning or other purposes. You will almost certainly not be able to replace the corrector in its proper rotational orientation and serious degradation of optical performance will result. Meade Instruments assumes no liability for damage incurred to the telescope in this way.

e. If the RCX400 is used outdoors on a humid night, water condensation on the telescope surfaces will probably result. While such condensation does not normally cause any damage to the telescope, it is recommended that the entire telescope be wiped down with a dry cloth before the telescope is packed away. Do not, however, wipe any of the optical surfaces. Rather, simply allow the telescope to sit for some time in the warm indoor air, so that the wet optical surfaces can dry unattended.

f. Do not leave your RCX400 inside a sealed car on a warm summer day; excessive ambient temperatures can damage the telescope's internal lubrication and electronic circuitry.

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TELESCOPE SPECIFICATIONS

Total instrument capacity . . . . . 500 lbs.
Aperture . . . . . 16" & 20"
Optical design . . . . . Advanced Ritchey-Chrétien
Optical coatings . . . . . UHTC™
Mount . . . . . Robotic Equatorial
Gear pitch diameter . . . . . 13.625"
Periodic error . . . . . 2 arc sec.
Latitude . . . . . 0-90°
No. of drive gear teeth . . . . . 652 (RA & DEC)

MAX	Mount Only	16" RCX	20" RCX
Optical Design		Advanced Ritchey-Chrétien	Advanced Ritchey-Chrétien
Clear Aperture		16"	20"
UHTC™ Coatings Standard		Ultra-High Transmission Transmission Coatings (UHTC™	
Resolving Power (Dawes Limit)		.285 arc seconds	.228 arc seconds
Focal Length, Focal Ratio		3251mm, f/8	4064mm, f/8
Telescope Mounting		MAX Robotic Equatorial Mount	
Periodic Error Correction Both axes	Ten (10) arc seconds (raw); Two (2) arc seconds with PECTOOL		
Control Panel	2 multi-function, multi-port panels		
Focus 4-speed front focusing mechanism		included	included
GPS, North sensors included	16-channel GPS receiver	16-channel GPS receiver (on Mount)	
Pointing Precision	High Precision Mode 1-arc min.		
Autostar® II Hand Controller	Included (147,541 object database)		
Alignment	Equatorial		
North electronic sensors	Included		
Temperature Control		Thermal stabilization fan	
Power	12VDC, 5amp power supply required		
Slew Speeds:	RA and Dec: 0.01x to1.0x sidereal, variable in0.01x increments; 2x, 8x, 16x, 64x, 128x sidereal; 1°/sec. to 2°/sec., variable in 0.1° increments All models		
Tracking Rates	Sidereal, lunar, solar or custom-selected from 2000 incremental rates All models		
Primary, Secondary Mirrors		Pyrex® glass, fine-annealed	
Correcting Plate/Lens		Borofloat	
Adjustable Counterweights	Requires 2 - 35lb. Counterweights (included)	Requires 3 - 35lb. Counterweights (included)	Requires 2 - 35lb. Counterweights (included)
Fixed Counterweights	Requires 2 - 43lb. Counterweights (included)	Requires 2 - 43lb. Counterweights (included)	Requires 2 - 43lb. Counterweights (included)
Accessories		8 x 50mm viewfinder, 2.0" diagonal mirror with 1.25" adapter, UltraWide 24mm eyepiece. (16" and 20" models)	
Total Net Weight	329 pounds (no counterweights)	140 pounds (OTA only)	190 pounds (OTA only)

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Weights and Dimension	Weights	Dimensions
RA Housing Assembly	66 pounds	L = 20.75"; W = 18.85"; H = 20.34".
Dec Housing Assembly	75 pounds	L = 18.25"; W = 15"; H = 20.45".
Counterweight Shaft Assembly		
Individual Counterweight	35 pounds	L = 5.9"; W = 5.9"; H = 2.96".
Portable Tripod	81 pounds	Height: 26.5 inches;
Footprint radius: 30 inches		
Permanent Pier	39 pounds	Minimum Height: 22"; Maximum Height: ?? Tube Diameter: 11.9"
Optical Tube Assembly (OTA)		
16” RCX OTA	140 pounds	L = 33"; W = 21"; H = 21".
20” RCX OTA	190 pounds	L = 40"; W = 25.7"; H = 25.7".
16"OTA + MAX Mount + Counterweights	609 pounds	L = 40"; W = 25.7"; H = 97.67".
20" OTA + MAX Mount + Counterweights	694 pounds	L = 40"; W = 25.7"; H = 99.67".
Optional Accessories	20 pound Counterweight Dovetail Instrument mount assembly	

Advanced Autostar II System Specifications

Processors .....10 processors arranged in a Distributed Intelligent Network Architecture to facilitate parallel task management (U.S. Patent 6,304,376)
Flash Memory .....4 MB, reloadable
Database.....180,000 objects
Drive Control.....Smart Mount, plus
185-speeds on both axes

Autostar II Handbox Specifications

Keypad .....20 key alphanumeric
Display .....2 line, 16 character LCD
Backlight .....Red LED
Utility Light .....Yes
Coil Cord.....24"
Length.....6.56" (16.6cm)
Width (LCD end).....3.19" (80cm)
Width (Connector end) .....2.25" (57cm)
Depth .....0.81" (21cm)
Autostar II net weight .....1.12 lbs (0.51kg)

Meade Consumer Solutions

If you have a question concerning your Max or RCX400, contact the Meade Instruments Consumer Solutions Department at:

Telephone: (800) 626-3233

Consumer Solutions hours are 8:00 AM to 5:00 PM, Pacific Time, Monday through Friday. In the unlikely event that your Max Mount or RCX400 requires factory servicing or repairs, write or call the Meade Consumer Solutions Department first, before returning the telescope to the factory, giving full particulars as to the nature of the problem, as well as your name, address, and daytime telephone number. The great majority of servicing issues can be resolved by telephone, avoiding return of the telescope to the factory. If factory service is required, you will be assigned a Return Goods Authorization (RGA) number prior to return.

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APPENDIX A: LATITUDE CHART

Latitude Chart for Major Cities of the World

To aid in the polar alignment procedure, latitudes of major cities around the world are listed below. To determine the latitude of an observing site not listed on the chart, locate the city closest to your site. Then follow the procedure below:

Northern hemisphere observers (N): If the site is over 70 miles (110 km) North of the listed city, add one degree for every 70 miles. If the site is over 70 miles South of the listed city, subtract one degree per 70 miles.

Southern Hemisphere observers (S): If the site is over 70 miles (110 km) North of the listed city, subtract one degree for every 70 miles. If the site is over 70 miles South of the listed city, add one degree per 70 miles.

NORTH AMERICA

City	State/Prov./Country	Latitude
Albuquerque	New Mexico	35° N
Anchorage	Alaska	61° N
Atlanta	Georgia	34° N
Boston	Massachusetts	42° N
Calgary	Alberta	51° N
Chicago	Illinois	42° N
Cleveland	Ohio	41° N
Dallas	Texas	33° N
Denver	Colorado	40° N
Detroit	Michigan	42° N
Honolulu	Hawaii	21° N
Jackson	Mississippi	32° N
Kansas City	Missouri	39° N
Kenosha	Wisconsin	45° N
Las Vegas	Nevada	36° N
Little Rock	Arkansas	35° N
Los Angeles	California	34° N
Mexico City	Mexico	19° N
Miami	Florida	26° N
Minneapolis	Minnesota	45° N
Nashville	Tennessee	36° N
New Orleans	Louisiana	30° N
New York	New York	41° N
Oklahoma City	Oklahoma	35° N
Ottawa	Ontario	45° N
Philadelphia	Pennsylvania	40° N
Phoenix	Arizona	33° N
Portland	Oregon	46° N
Salt Lake City	Utah	41° N
San Antonio	Texas	29° N
San Diego	California	33° N
San Francisco	California	38° N
Seattle	Washington	47° N
Washington	District of Columbia	39° N

EUROPE

City	Country	Latitude
Amsterdam	Netherlands	52° N
Athens	Greece	38° N
Bern	Switzerland	47° N
Copenhagen	Denmark	56° N
Dublin	Ireland	53° N
Frankfurt	Germany	50° N
Glasgow	Scotland	56° N
Helsinki	Finland	60° N
Lisbon	Portugal	39° N
London	England	51° N
Madrid	Spain	40° N
Oslo	Norway	60° N
Paris	France	49° N
Rome	Italy	42° N
Stockholm	Sweden	59° N
Vienna	Austria	48° N
Warsaw	Poland	52° N

SOUTH AMERICA

City	Country	Latitude
Bogotá	Colombia	4° N
São Paulo	Brazil	23° S
Buenos Aires	Argentina	35° S
Montevideo	Uruguay	35° S
Santiago	Chile	34° S
Caracas	Venezuela	10° N

ASIA

City	Country	Latitude
Beijing	China	40° N
Hong Kong	China	23° N
Seoul	South Korea	37° N
Taipei	Taiwan	25° N
Tokyo	Japan	36° N
Sapporo	Japan	43° N
Bombay	India	19° N
Calcutta	India	22° N
Hanoi	Vietnam	21° N
Jedda	Saudi Arabia	21° N

AFRICA

City	Country	Latitude
Cairo	Egypt	30° N
Cape Town	South Africa	34° S
Rabat	Morocco	34° N
Tunis	Tunisia	37° N
Windhoek	Namibia	23° S

AUSTRALIA AND OCEANIA

City	State/Country	Latitude
Adelaide	South Australia	35° S
Brisbane	Queensland	27° S
Canberra	New South Wales	35° S
Alice Springs	Northern Territory	24° S
Hobart	Tasmania	43° S
Perth	Western Australia	32° S
Sydney	New South Wales	34° S
Melbourne	Victoria	38° S
Auckland	New Zealand	37° S

Looking at or near the **Sun** will cause **irreversible** damage to your eye. Do not point this telescope at or near the Sun. Do not look through the telescope as it is moving.

APPENDIX B: THE MOON

The Moon option of the Object menu allows you to observe the moon in a way never possible before. You will be able locate many specific features of the lunar surface, including hundreds of craters, mare, valleys, and mountains. One special feature allows you to view all six Apollo landing sites. While you won't be able to see details such as any of the lunar landers or lunar excursion modules left behind by the astronauts (the best earth-based telescopes can only resolve features of about a half-mile across), you'll be able pinpoint the landing sites and study the terrain surrounding these sites.

When Autostar II syncs to a lunar feature, the telescope switches to Selenographic coordinates, *i.e.*, lunar latitude and longitude.

To observe the Apollo 15 landing site using the Moon option:

1. Initialize and align the telescope system as previously described.
2. Press "5" on the Autostar II keypad. "Solar System: Mercury" displays.
3. Press a Scroll key until "Solar System: Moon" displays. Press ENTER.
4. "Moon: Overview" displays. Press GO TO. The telescope slews to the Moon.
5. With "Moon: Overview" on Autostar II's display, use the Scroll keys to browse through the menus options. Five categories of features are available: Landing Sites, Craters, Mountains, Mare and Lakes, and Valleys and Rills.
6. Select a distinct lunar crater with which you are familiar, such as Copernicus or Kepler, from the Craters option and press ENTER.
7. Then press GO TO to slew to that feature. Center the feature in the eyepiece and hold down ENTER for more than two seconds to ENTER TO SYNC. The telescope is now synced to Selenographic coordinates.
8. Press MODE twice to return to the features list. Press a Scroll key until "Moon: Landing Sites" displays.
9. Press ENTER. "Landing Sites: Apollo 11" displays.
10. Press a Scroll key until "Landing Sites: Apollo 15" displays.
11. Press GO TO. The telescope slews to the Apollo 15 site.
12. Press MODE to return to the previous menu option. Continue to press MODE to exit this menu.

Use this method to find other lunar features and points of interest. When you have selected a feature, press the "?" key or use the Scroll keys to display detailed information about the feature. Press MODE to return to the menu options.

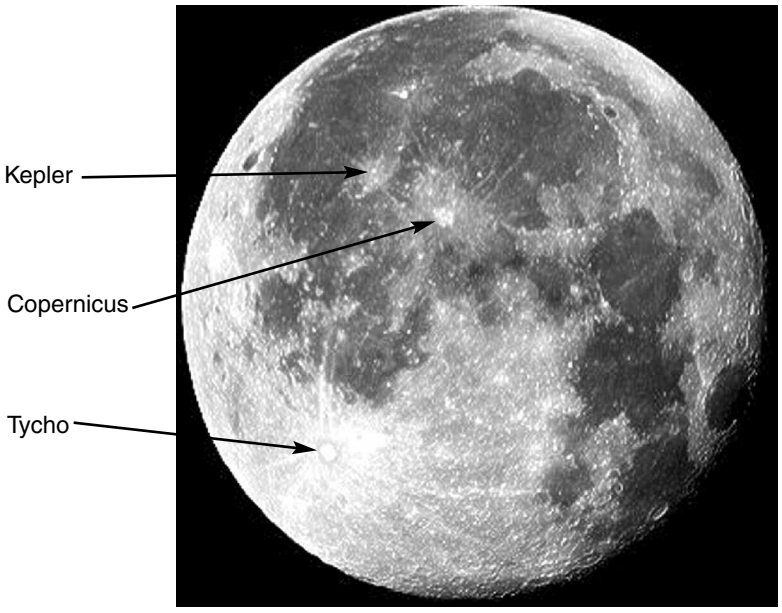

Figure 56: Some easily recognized lunar craters.

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APPENDIX C:
Smart Mount

Introduction
Smart Mount improves the pointing accuracy of your RCX400 telescope's "Go to" system. Despite careful efforts to calibrate and align telescopes, they may fail to precisely center objects. Smart Mount allows your telescope to learn about, and then correct for, any systematic pointing errors, regardless of the cause.

Because training your mount takes some time, we recommend that it be primarily used on permanently mounted instruments or when imaging requires very accurate pointing. Once Smart Mount training has been performed, the scope will benefit from it so long as you carefully park the telescope at the end of each session and do not modify the mounting.

For portable instruments, we recommend training Smart Mount each time you set up your telescope to insure best results.

We recommend that you use an *illuminated reticle* during the training procedure. An illuminated reticle allows you to precisely center celestial objects in a telescope's eyepiece. The more precisely you center objects during Smart Mount training, the more pointing precision your telescope will be able to achieve.

Operation
The Smart Mount feature is located in the Autostar II Setup menu.

In order to use Smart Mount, create a model that allows Smart Mount to improve your telescope's accuracy. This is normally done by training Smart Mount. Once training has been completed, you will save your model. Autostar II allows you to save several models under different names. This allows you to, for example, save one model for a heavy imaging camera configuration on a permanently aligned scope, and another when you have a lighter load on the mount.

Training
In order to obtain solid, repeatable results, perform the following procedures *before* you create a model:

- Auto align
- Drift align
- Collimate
- Align OTA
- Calibrate Home
- Then train both the RA and Dec training calibration

Once you have calibrated and aligned your telescope, if you wish to start a new model, go to the Smart Mount main menu. Locate and select "Erase" to clear the current model. Next, proceed with the steps below:

> ***Note:*** *If you do not erase the current model, the training session will refine the current model.*

- Locate "Train" in the Smart Mount Configuration menu and press enter.
- The telescope will select and slew to several (over 40) stars.
- When requested to do so, carefully center each star and then press ENTER.

If you find that you cannot see a star because there is an obstruction blocking your view:

- Press MODE briefly to skip this star. Another star will be chosen.

To exit the training sequence before it is completed:

- Press and hold MODE for about two seconds and then release it.

When you have completed training:

Looking at or near the **Sun** will cause **irreversible** damage to your eye. Do not point this telescope at or near the Sun. Do not look through the telescope as it is moving.

- Save your model, using a good, descriptive name, using the “Save As” menu. Upon completion of the training, Smart Mount is enabled and *remains on* until you choose “Off” from the Smart Mount Configuration menu.

Permanently Mounted Scopes
For permanently mounted telescopes, it is not necessary to have more than one model unless the weight and balance of auxiliary equipment introduces balance or flexure changes that significantly affect pointing. The best practice is to train the Smart Mount and then run a couple of sessions with Update enabled. Thereafter, simply leave Smart Mount On as the installation default.

Other Menus Options

Save As and Load
The Smart Mount system allows you to save several models you have created (see **TRAINING** on the previous page) using the Save As command. Choose which model will be the "Current Model” using the Load command.

Update
The Update mode allows you to update training for the current model you have enabled. You will sync on several stars as previously described, which will further refine the pointing of your telescope. Save your model after running in update mode, otherwise the update will be lost when the telescope is powered off.

On
Load a model from memory (see **SAVE AS AND LOAD** above) and then Select Smart On. When Smart Mount is "On," the telescope will use the currently loaded model to refine your telescope's pointing, but will not update the model (see **SMART MOUNT UPDATE** above). If Smart Mount was "On" when you last powered off your telescope, it will be "On" when you start the next session.

Off
When Smart Mount is "Off," the telescope will not use any model you have created to refine pointing accuracy.

Erase
The Erase command clears the Current Smart Mount table values to allow a new model to be created.

Delete
The Delete command allows you to delete any model from memory. To delete a model, just scroll through the names and select the model to you wish to delete and press ENTER. You will be asked to confirm your choice. Press ENTER again and it will be removed from memory.

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Every Meade telescope, spotting scope, and telescope accessory is warranted by Meade Instruments Corporation (“Meade”) to be free of defects in materials and workmanship for a period of ONE YEAR from the date of original purchase in the U.S.A. and Canada. Meade will repair or replace a product, or part thereof, found by Meade to be defective, provided the defective part is returned to Meade, freight-prepaid, with proof of purchase. This warranty applies to the original purchaser only and is non-transferable. Meade products purchased outside North America are not included in this warranty, but are covered under separate warranties issued by Meade international distributors.

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